INDIA RUBBER WORLD

JANUARY, 1946

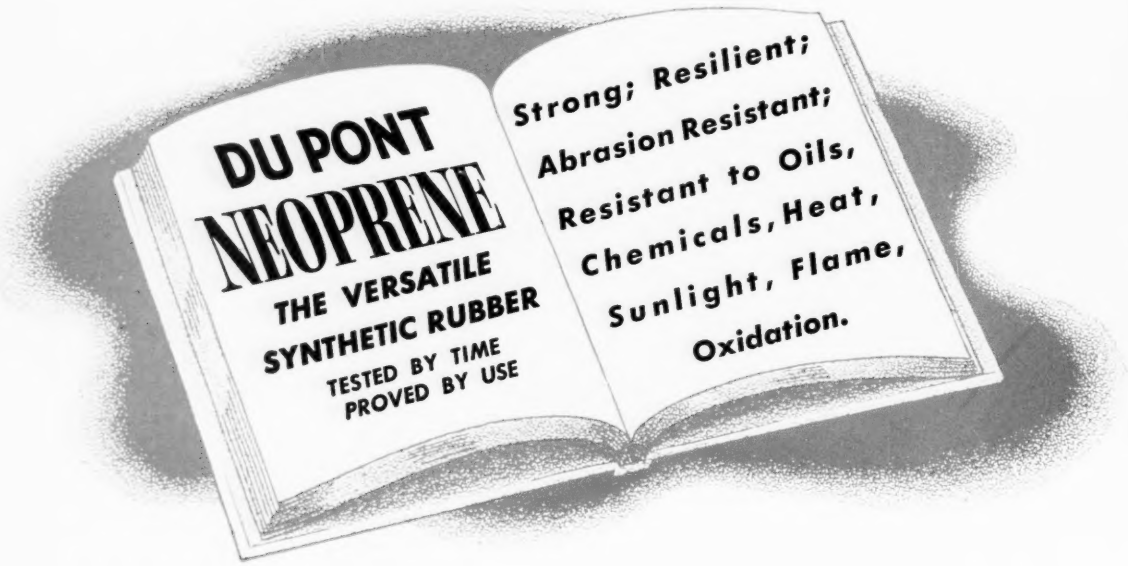
Sterling-S

in CARCASS STOCKS
in CURING BAGS
Low Cost - Good Thermal Conductivity

GODFREY L. CABOT, INC., BOSTON, MASS.

Newsletter No. 1
JANUARY, 1946

Published by Rubber Chemicals Division of DU PONT



NEOPRENE TYPES AVAILABLE...

NEOPRENE TYPE CG — Primarily for quick-setting, high bond strength adhesives. Provides greater stiffness in uncured stocks.

NEOPRENE TYPE E—Limited use for specialties. Does not soften progressively with prolonged milling.

NEOPRENE TYPE FR—Freeze resistant. For low temperature service and maximum resilience.

NEOPRENE TYPE KNR — For troweling putties and paints used in tank linings and protective surface coatings. For preparing easily processed, highly loaded stocks.

NEOPRENE LATEX TYPE 571—Approximately 50% of solids. All-purpose latex for general use.

NEOPRENE LATEX TYPE 571 CONCENTRATE—Approximately 59% solids. For general use where high solids are required. Minimum of odor.

NEOPRENE LATEX TYPE 572 — Approximately 50% solids. A fast-setting, high wet strength latex for adhesives.

NEOPRENE LATEX TYPE 60 — Approximately 59% solids. A high solid latex for special applications. Especially suited for froth sponge and dipped goods.

NEOPRENE GRM and GRM-10 — General purpose neoprenes supplied only by Rubber Reserve Company, Louisville, Ky. Purchase permits required.

Let Du Pont Service help you with your problems. Write or call:

E. I. du Pont de Nemours & Co. (Inc.),
Rubber Chemicals Division, Wilmington 98, Del.

BUY AND HOLD VICTORY BONDS

DU PONT
REG. U. S. PAT. OFF.

RUBBER CHEMICALS DIVISION

BETTER THINGS FOR BETTER LIVING . . . *Through Chemistry*

India Rubber World, January, 1946, Vol. 113, No. 4. Published monthly by Bill Brothers Publishing Corp., 386 Fourth Avenue, New York 16, N. Y., U. S. A. Entered as second-class matter December 27, 1944, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Subscription, United States and Mexico, $3.00 per year; all other countries, $4.00; single copies, 35 cents.

HYCAR ad boosts selected combinations of properties

Tells your prospects HYCAR can be compounded to meet specific service requirements

THE current HYCAR advertisement appearing in a long list of business and trade publications describes an application in the aviation industry. HYCAR was selected for the application because it was known in advance that the properties needed to meet predetermined service conditions could be obtained in exactly the right combination. It was only a matter of proper compounding.

This is the kind of story that encourages men in all industry to ask for parts made from HYCAR—and it should encourage you and your sales staff in your efforts to sell profitable *quality* products instead of low-margin competitive ones.

We provide *you* with 3 helps that make it easier for *you* to sell parts made from this *superior* material:

. . . High quality special purpose synthetic rubbers
. . . Technical aid in compounding problems
. . . A strong national advertising program directed to *your* prospects.

For more information about HYCAR synthetic rubber, or for help with your problems, please write Dept. HC-1, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

Hycar

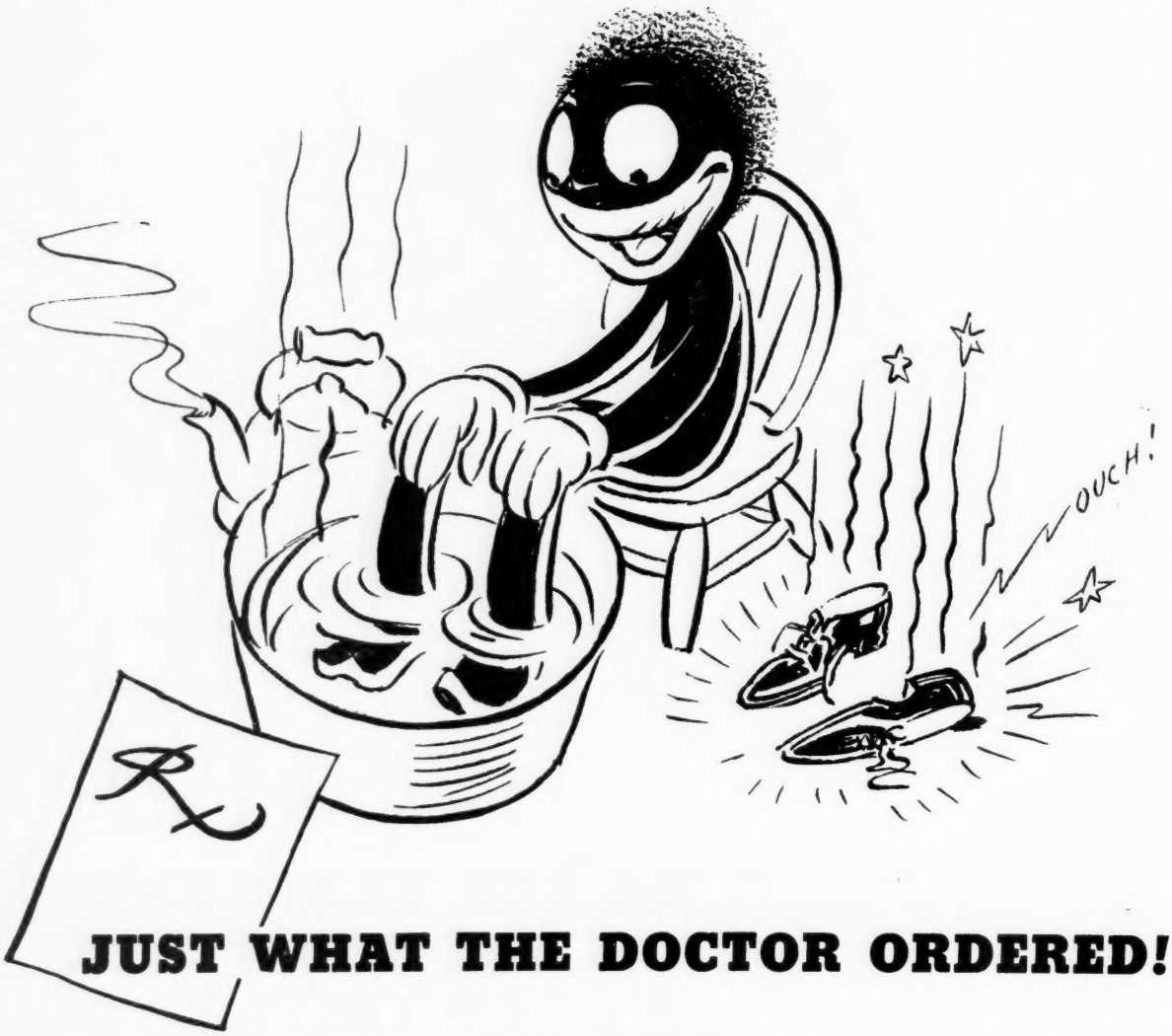
Reg. U. S. Pat. Off.

LARGEST PRIVATELY PRODUCED BUTADIENE TYPE

Synthetic Rubber

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY



JUST WHAT THE DOCTOR ORDERED!

Home remedy? Not a bit of it! Philblack A is a modern, highly scientific "prescription" used successfully by many makers of tires, tubes, and other rubber goods. It removes the nerve from rubber easily . . . and with the least possible pain to the rubber manufacturer!

While Philblack A is no panacea, it cures or alleviates many of the other ills that synthetic rubber is heir to. As follows:

Symptoms and Treatment

Use Philblack A to lower heat build-up . . . to aid easier and faster processing . . . to increase resistance to abrasion . . . to build up better immunity to cut and crack growth . . . and for better-looking finished products!

PHILLIPS PETROLEUM COMPANY

Philblack *Division*

FIRST CENTRAL TOWER BUILDING · AKRON, OHIO

BE COMPETITIVE IN QUALITY AND STILL HAVE LOW COSTS

Take advantage of:

1. Technical Service based on experience.

2. Efficient compounding materials.

***These you can get by calling on* NAUGATUCK CHEMICAL**

Naugatuck Chemical maintains a completely equipped rubber laboratory with a staff whose experience covers all branches of rubber goods manufacturing.

Naugatuck Chemical offers you a complete line of rubber chemicals including accelerators, antioxidants and special purpose products.

FOR QUALITY AND LOW COST INVESTIGATE

***ACCELERATORS* – BJF – MBT – MONEX**

***ANTIOXIDANTS* – BLE – AMINOX – BLE POWDER**

***SPECIAL PRODUCTS* – LAUREX – SUNPROOF**

PROCESS – ACCELERATE – PROTECT
WITH

NAUGATUCK CHEMICAL

Division of United States Rubber Company

ROCKEFELLER CENTER, 1230 AVENUE OF THE AMERICAS, NEW YORK 20, N. Y.

HARCHEM offers you a *complete* line of Plasticizers for Vinyl Resins, Synthetic Rubbers and other Plastics and Elastomers.

HARCHEM has developed a variety of Plasticizers, each with its own special combination of properties. This enables the user to select that particular product most suited to his own needs.

Consult us if you have a Plasticizer problem. Our technical staff will be glad to assist you.

BINNEY AND SMITH CO.

DISTRIBUTOR TO THE RUBBER INDUSTRY

HARDESTY CHEMICAL CO., INC.

41 EAST FORTY-SECOND STREET, NEW YORK 17, N.Y.

Yes....

Philadelphia Reclaim

is Good!

★ For some months in these pages we've been saying that Philadelphia reclaim has an important place in American industry—because for many purposes it is the most economical compounding material that can be found; stable and dependable; compatible with natural and synthetic rubbers.

Industry in general must agree with our statements — for right now *there just isn't enough Philadelphia reclaimed rubber to meet the enormous demand.*

Our apologies won't do you any good. So instead of apologizing we'll pledge ourselves to produce every pound of Philadelphia reclaim that it's in our power to produce—and fast.

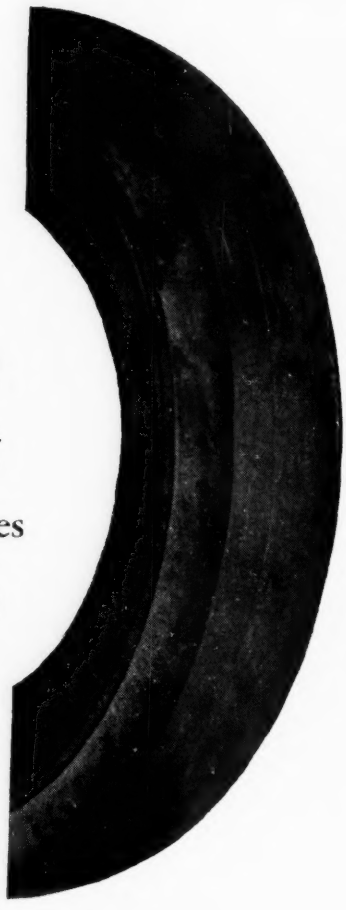
Peak demand should be reached soon, and that will give us a chance to catch up. So please be patient. And don't forget what you already have learned—that Philadelphia reclaim is *good.* The Philadelphia Rubber Works Company, Dept. BA-1, Rose Building, Cleveland 15, Ohio.

PHILADELPHIA
RECLAIMED RUBBER

Now...

ROAD TESTS

Confirm Advantages of Compounding GR-S Tires with RED LEAD



Heat build-up and heat stability both improve when you compound GR-S tires with Red Lead-Thiazole acceleration—as indicated in data previously presented.

Now comes confirmation of these advantages . . . results of both wheel and road tests on tires in which GR-S–Red Lead compounds were used throughout, for tread, breaker and carcass stocks, in regular plant runs.

In the wheel tests, the GR-S–Red Lead tires exceeded the comparison standard by 50%—conclusive proof of improvement in both heat build-up and heat stability.

This has now been borne out in road tests on the San Antonio course. Standard 4-ply 6.00 x 16 tires were used, at 60 miles per hour, with a 25% overload, on cars running continuously twenty hours a day.

At 21,000 miles the treads wore smooth, leaving the tires with no structural failures and in excellent condition—ready to take a GR-S–Red Lead retread and continue to give thousands of miles more of useful service.

Further Information *will gladly be supplied by the Rubber Division of our Research Laboratories.*

ADVANTAGES OF COMPOUNDING GR-S WITH RED LEAD

1. Imparts improved heat resistance—retention of elasticity
2. Imparts improved heat build-up—cooler running
3. Excellent general physical properties
4. Safe processing
5. Broad curing plateau—very little change in properties on overcures
6. Economical
7. Available

NATIONAL LEAD COMPANY New York 6, Buffalo 3, Chicago 80, Cincinnati 3, Cleveland 13, St. Louis 1, San Francisco 10, Boston 6 (National-Boston Lead Co.); Pittsburgh 30 (National Lead & Oil Co. of Penna.); Philadelphia 7 (John T. Lewis & Bros. Co.)

NAFTOLEN

REG. U.S. PAT. OFFICE

KNOWN THROUGHOUT THE WORLD AS A HIGH QUALITY PRODUCT

WILMINGTON CHEMICAL CORPORATION introduced the initial sulfur-reactive plasticizer to rubber manufacturers and has consistently led in the development of new types of plasticizer to suit the individual manufacturer's need.

Whether your problem is price, physical properties or processing properties, we can furnish a quality product to meet your requirement.

W C=C

REG. U. S. PAT. OFFICE

WILMINGTON

CHEMICAL CORPORATION

10 EAST 40TH STREET • NEW YORK 16, N. Y.

Now Available.....

GOODRITE ERIE

an outstanding accelerator for low heat build-up in compounding GR-S and natural rubber

VULTROL

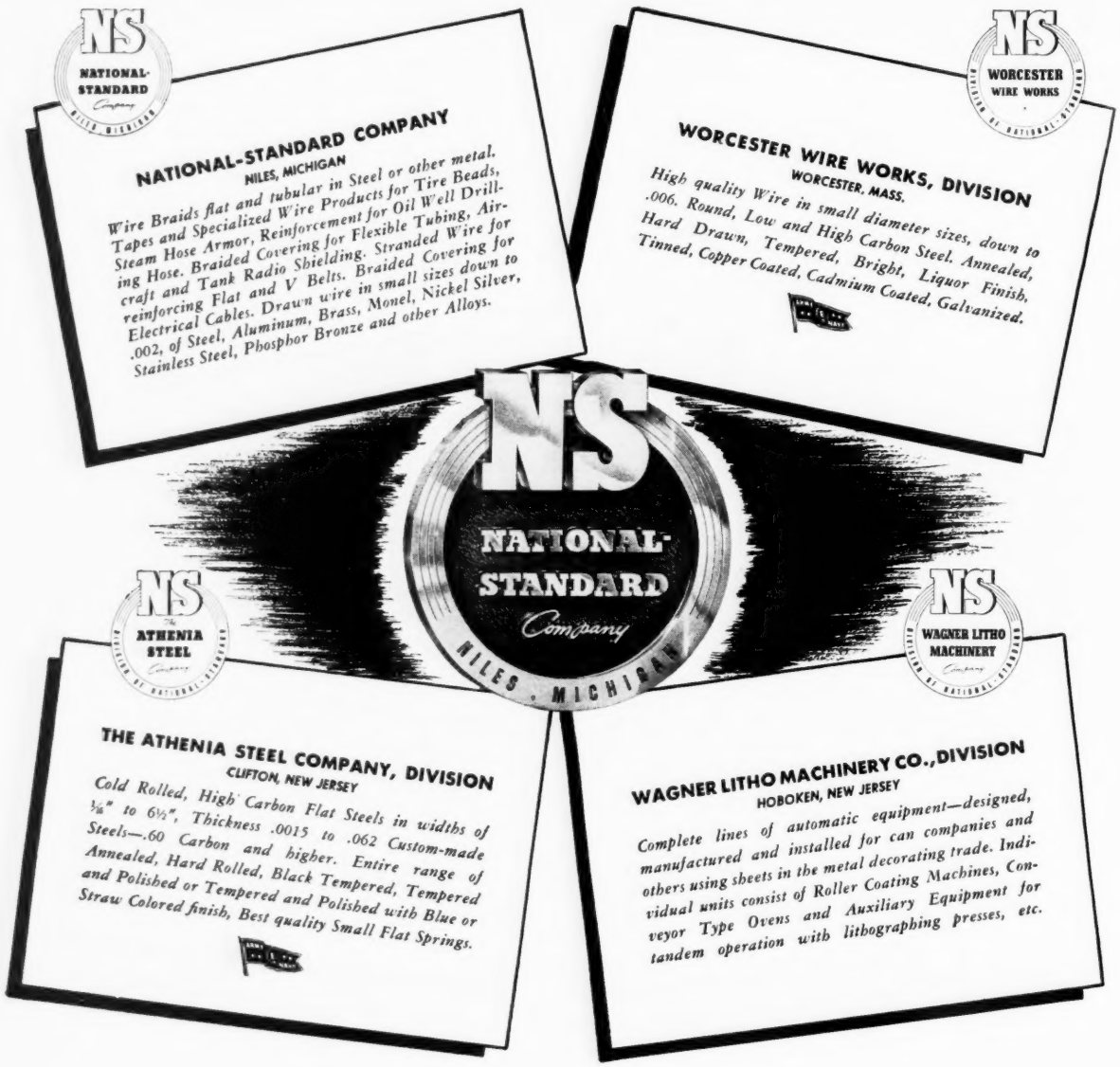
for use in synthetic rubber compounding to prevent scorching, and for recovering scorched stocks

For technical data please write

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

ROSE BUILDING CLEVELAND 15, OHIO


NS
NATIONAL-STANDARD Company
NILES, MICHIGAN
NATIONAL-STANDARD COMPANY
NILES, MICHIGAN
Wire Braids flat and tubular in Steel or other metal. Tapes and Specialized Wire Products for Tire Beads, Steam Hose Armor, Reinforcement for Oil Well Drilling Hose. Braided Covering for Flexible Tubing, Aircraft and Tank Radio Shielding. Stranded Wire for reinforcing Flat and V Belts. Braided Covering for Electrical Cables. Drawn wire in small sizes down to .002, of Steel, Aluminum, Brass, Monel, Nickel Silver, Stainless Steel, Phosphor Bronze and other Alloys.
NS
WORCESTER WIRE WORKS
WORCESTER WIRE WORKS, DIVISION
WORCESTER, MASS.
High quality Wire in small diameter sizes, down to .006. Round, Low and High Carbon Steel. Annealed, Hard Drawn, Tempered, Bright, Liquor Finish, Tinned, Copper Coated, Cadmium Coated, Galvanized.
NS
NATIONAL-STANDARD Company
NILES • MICHIGAN
NS
ATHENIA STEEL
THE ATHENIA STEEL COMPANY, DIVISION
CLIFTON, NEW JERSEY
Cold Rolled, High Carbon Flat Steels in widths of 1/16" to 6 1/2", Thickness .0015 to .062 Custom-made Steels—.60 Carbon and higher. Entire range of Annealed, Hard Rolled, Black Tempered, Tempered and Polished or Tempered and Polished with Blue or Straw Colored finish, Best quality Small Flat Springs.
NS
WAGNER LITHO MACHINERY
WAGNER LITHO MACHINERY CO., DIVISION
HOBOKEN, NEW JERSEY
Complete lines of automatic equipment—designed, manufactured and installed for can companies and others using sheets in the metal decorating trade. Individual units consist of Roller Coating Machines, Conveyor Type Ovens and Auxiliary Equipment for tandem operation with lithographing presses, etc.

What Makes These Four Divisions Alike?

Is it merely that they are grouped together under National-Standard's leadership?

No, their kindredness is much more basic.

Each of the four divisions of National-Standard has the unusual faculty for putting itself in its customer's shoes.

Each division likes to tackle tough assignments . . . has long experience in analyzing problems peculiar to many different industries. And, even after a better steel, wire, or any one of the other products listed is developed, work does not stop . . . ways and means of improving a product, its method of use or application are still studied.

Securing better results for the customers of each National-Standard Division is what really makes them alike.

These unique services have won a host of friends . . . we would like to add your Company to this growing list of satisfied customers.

Make a better LEATHERETTE with SYNTRON

Through years of constant laboratory research, Gordon-Lacey has evolved formulas for SYNTRON COATINGS to make *better* LEATHERETTE.

LEATHERETTE made with SYNTRON Coatings produces a finish that is (1) TOUGH and DURABLE; (2) ABRASION-RESISTANT; (3) SOFT and FLEXIBLE; (4) RESISTANT to ACIDS, ALKALIS and CHEMICALS; (5) RESISTANT to OILS and GREASES; and (6) 100% WATERPROOF.

If you have a special coating problem

. . . Gordon-Lacey can develop a *custom-made* coating to fit *your* individual needs . . . a coating that is exactly right for your particular requirements, whether for cotton, rayon, nylon, fiberglass or any other fabric surface. Gordon-Lacey research laboratories are ready to solve your coating problems regardless of the trade you service. Send us the story of your coating problems.

GORDON-LACEY CHEMICAL PRODUCTS CO.

57-02 48th STREET • MASPETH, NEW YORK

*TRADE MARK

Here's a BALDWIN PRESS to help you increase production and improve your product

HY SPEED SEMI-AUTOMATIC PLUNGER MOLDING 50 to 300 TONS

SPECIFICATIONS
HY SPEED SEMI-AUTOMATIC PLUNGER MOLDING PRESS

Maximum Press Capacity	50 Tons	100 Tons	200 Tons	300 Tons
Die Area L to R, F to B	21" x 20"	24" x 20"	30" x 24"	36" x 24"
Minimum Daylight Between Platens	27½"	28"	31"	35"
Maximum Daylight Between Platens	33½"	34"	40"	44"
Thickness Upper Bolster	10"	10"	10"	10"
Thickness Lower Bolster	5½"	6"	6"	7"
Stroke	12"	12"	15"	18"
Overall Height	9'2"	9'7"	12'0"	12'0" Ext. Below Floor 2'0" Total Height 14'0"
Floor Space S to S, F to B	4'0"x3'6"	4'8"x4'0"	5'6"x5'0"	5'0"x3'6" Pumping Unit 3'8"x6'0"

With the largest markets in history ready, waiting and eager to buy, plants all over the nation are tooling up for top production . . . and no one can afford to be left behind. This Baldwin press offers the features you need, and delivery can be made promptly. The Baldwin Locomotive Works, Baldwin Southwark Division, Philadelphia 42, Pa., U. S. A. Offices: Philadelphia, New York, Boston, Washington, Chicago, Cleveland, St. Louis, Detroit, San Francisco, Houston, Pittsburgh.

OTHER BALDWIN PRODUCTS: Hydraulic presses, Testing equipment, Steel forgings and castings, Diesel-electric locomotives, Diesel engines, Metal plate fabrication, Rolled steel rings, Bronze castings, Heavy machine work, Crane wheels, Bending rolls, Plate planers, Babbitt metal, Alloy iron castings, Briquetting presses.

BLW THE BALDWIN GROUP

BALDWIN
SOUTHWARK
HYDRAULIC PRESSES

For the Latex Processor

ACRYSOL GS

A completely synthetic thickener for rubber latices. Provides effective and permanent viscosity increase, particularly with GRS latices.

TRITON R-100

An efficient, low-cost dispersing agent for carbon black, dry pigments and vulcanizing agents.

TRITON N-100

A non-ionic dispersing and stabilizing agent for use with latex. Because it is unaffected by electrolytes, Triton N-100 is very useful in dipping operations.

These three products are among the many developed by Rohm and Haas research to aid in the efficient and economical compounding of natural and synthetic rubber latices.

TRITON *and* ACRYSOL *are trade-marks, Reg. U. S. Pat. Off.*

THE RUBBER CHEMICALS DEPARTMENT

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Manufacturers of Chemicals for the Rubber, Textile, Leather, Enamelware and other Industries . . . Plastics . . . Synthetic Insecticides . . . Fungicides . . . Enzymes

Technical Bulletin No. 17 — on the Compounding of GR-S with Substantial Loadings of Zinc Oxide

Improvement in Physical Properties by Banbury Masterbatching Zinc Oxide in GR-S

WITH XX Red-166 it is possible to make 90:10 Zinc Oxide : GR-S Masterbatches which are surprisingly plastic after standing several days. This is best accomplished in a two-step operation. First make a 70:30 Masterbatch, and then increase the pigment concentration to 90:10.

On dilution to 100 Zinc Oxide : 100 GR-S the Masterbatches show an improvement in physical properties of the same order as shown in the Latex Masterbatches where a dispersion of Zinc Oxide in water is added to GR-S Latex and then coagulated.

Results are shown for the immediate dilution of the Masterbatch, and after standing overnight. Somewhat better tensile values are obtained in the latter case. The Masterbatched stocks are somewhat slower curing than the direct mixed compound.

COMPOUND 17

GR-S	100.0
Sulfur	3.5
MBT	2.0
ELC Magnesia	5.0
Coumarone-Indene Resin	7.5
XX Red-166 Zinc Oxide	100.0

ORIGINAL RESULTS

Time of Cure Min. at 45 Lb.	Tensile Strength (psi)	Per Cent Elongation	Modulus Load (psi) for Elongation of: 200%	300%	400%	500%	Permanent Set	Shore Hardness	Tear Resistance Tested at: Room Temp.	100°C.
DIRECT MIXING—LABORATORY MILL										
7.5	1670	905	155	235	310	425	.39	39	80	37
15	1530	685	235	315	470	705	.28	45	62	36
30	1490	595	235	390	550	825	.27	48	59	35
45	1450	570	275	390	625	980	.26	48	66	35
60	1580	575	270	425	655	960	.26	49	58	34
90	1255	540	315	430	665	1020	.19	49	62	35
90:10 MASTERBATCH—DILUTED WHILE HOT										
7.5	1480	1075	120	160	200	240	.42	36	91	32
15	1920	830	200	240	320	440	.33	42	65	34
30	1860	715	240	275	395	595	.31	45	61	34
45	1600	630	240	320	440	720	.27	46	62	33
60	1480	645	240	320	440	680	.25	47	58	34
90	1520	630	240	320	440	640	.23	48	58	34
90:10 MASTERBATCH—DILUTED AFTER STANDING OVERNIGHT										
7.5	1200	1080	80	115	155	195	.44	35	92	33
15	1900	890	120	160	240	320	.43	41	61	32
30	1980	740	160	240	320	485	.33	45	58	33
45	1735	690	200	285	360	565	.29	45	61	35
60	1980	700	200	285	320	525	.32	47	58	35
90	1550	650	205	285	365	570	.26	47	64	35

Uniform Quality HORSE HEAD ZINC OXIDES

THE NEW JERSEY ZINC COMPANY
160 FRONT STREET • NEW YORK 7, N. Y.
Products Distributed by THE NEW JERSEY ZINC SALES COMPANY
NEW YORK • CHICAGO • BOSTON • CLEVELAND • SAN FRANCISCO

hammering home the superiority of RAYON CORD TIRES

HERE's a striking ad, in full color, hitting 17,294,279 more American motorists right between the eyes.

IN

Saturday Evening Post
Fortune
Look
American Magazine
Liberty
American Weekly

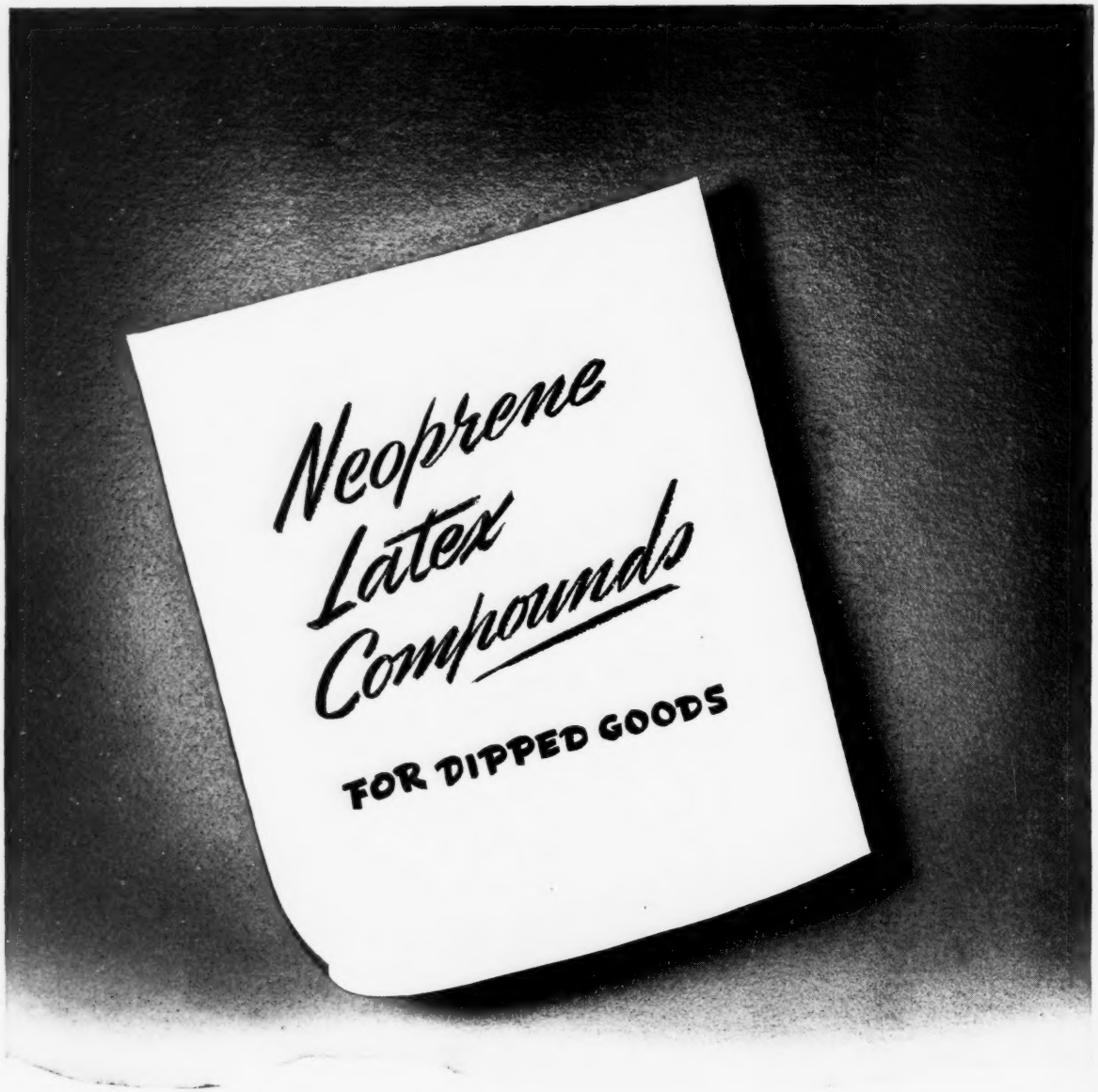
Its message: to tell America about Rayon Cord Tires—how they proved themselves in war and will soon be rolling the roads of peace—how they will run cooler, give longer mileage, with fewer blowouts and road failures. Now's the time to learn all you can about rayon's advantages in tires. Our booklet "Rolling on Rayon" tells the complete story. Send for it today; it's FREE.

*TYRON

*Reg. U. S. Pat. Off.

rayon for tires

Made by INDUSTRIAL RAYON CORPORATION
Cleveland, Ohio



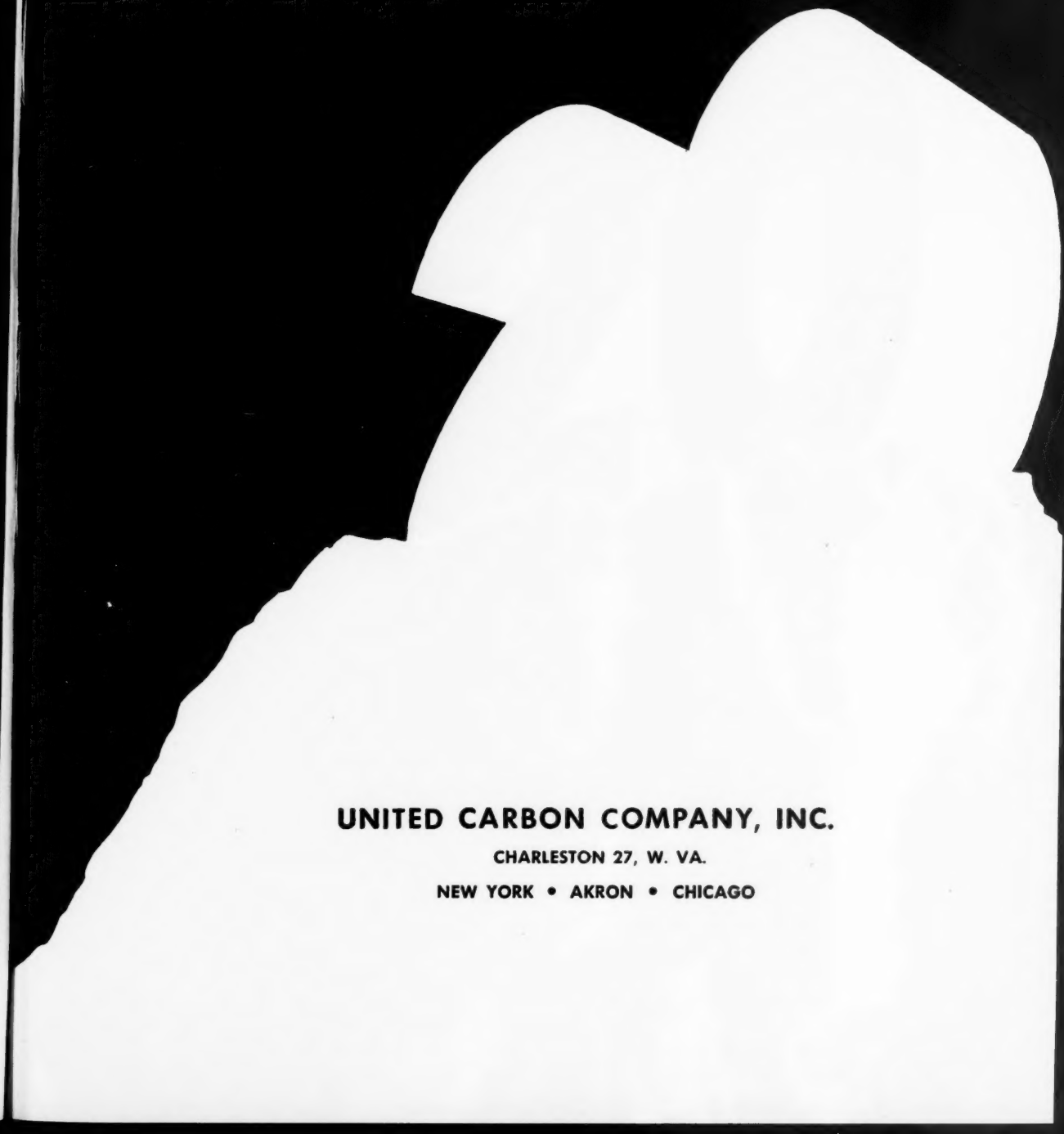
General Latex has developed several simplified neoprene latex compounds for dipped goods. These compounds are thoroughly "tried and proven" and in current use in many factories. Neoprene latex offers advantages not found in natural rubber latex—more particularly, high resistance to oxidation, sunlight, oils, and chemicals. If you are considering the manufacture of any dipped product, we suggest that you get in touch with our technical staff. Their years of experience with natural and neoprene latex will prove very helpful in formulating a neoprene compound custom-made to your specific needs.

General Latex
& CHEMICAL CORP.
666 MAIN STREET, CAMBRIDGE, MASS.

Vultex Division — Verdun Industrial Buildings, Verdun, Montreal, Quebec

Agents for Rubber Reserve Company for storage and distribution of natural rubber latex. Distributors for Rubber Reserve Company for synthetic latex. Operators of the Government owned Baytown, Texas, synthetic rubber plant in collaboration with the General Tire & Rubber Co.

KOSMOS
DIXIE



UNITED CARBON COMPANY, INC.

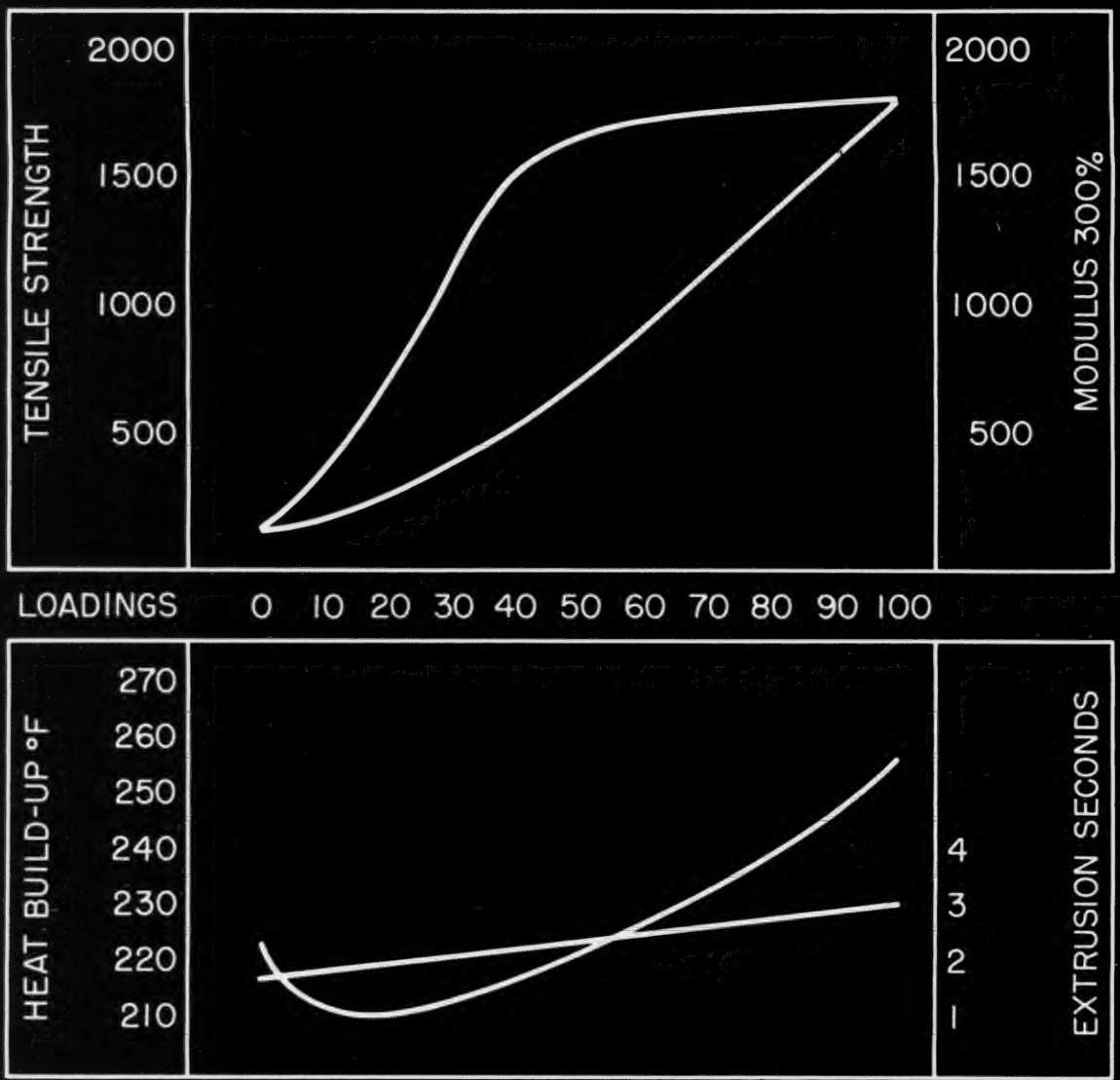
CHARLESTON 27, W. VA.

NEW YORK • AKRON • CHICAGO

KOSMOS 20 · DIXIE 20

SRF TYPE

SEMI-REINFORCING FURNACE DUSTLESS BLACK

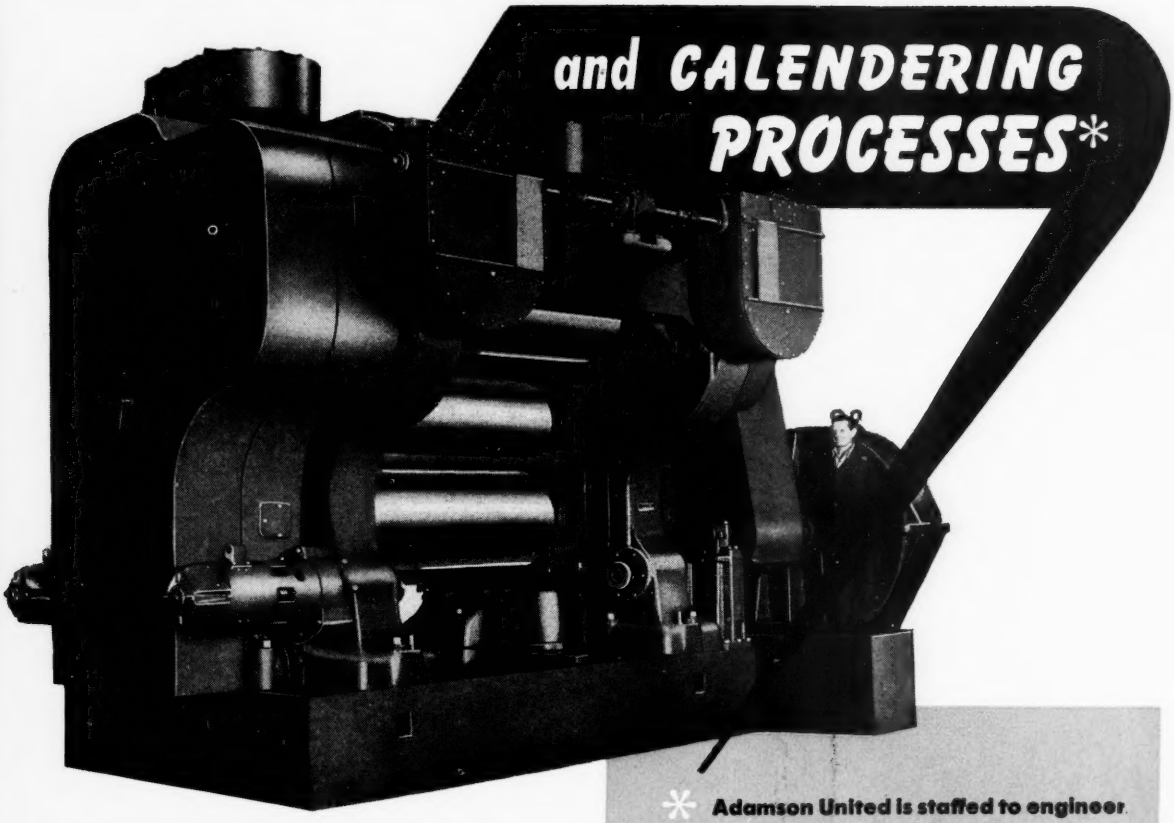


RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

CHARLESTON 27, W. VA.

ADAMSON UNITED CALENDERS and CALENDERING PROCESSES*



Adamson United Calenders are expressly designed for extremely close tolerance in the production of plastic film, or for the coating of fabric with rubber or plastic. Among their many features are:

- Extra heavy housings and totally enclosed piping with all exposed surfaces smooth for easy cleaning.
- Precision roll adjustment mechanism, with slack take-up, arranged for use with automatic gauging equipment.
- Adamson bearing design for high temperature operation with ample flow of filtered lubricant around the roll journals. Original anti-leak design of oil seals retains lubricant in bearings. Conditioning of lubricant insures uniform oil film thickness.
- Roll diameter and lengths are selected for each particular job. Various roll combinations are available.

Write for complete technical data, or consult our engineers concerning special rubber or plastics machinery or processes.

* **Adamson United is staffed to engineer and furnish complete calendering process systems for either Rubber or Plastics, including all accessory equipment, such as**

FABRIC DRYING
EXPANDER ROLLS
GUIDING DEVICES
ORIENTING ROLLS
COOLING ROLLS
STORAGE FESTOONS
WIND-UP AND LET-OFF STANDS

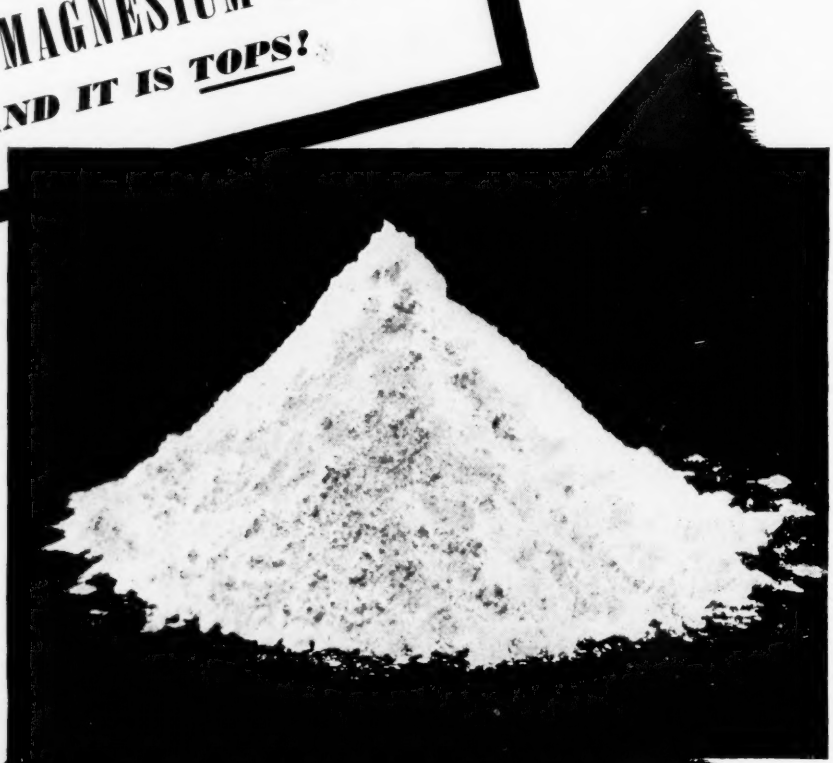
with associated coordinated drives.

ADAMSON UNITED COMPANY akron ohio

DISTRICT SALES OFFICES:
C. H. Armstrong, Manager, Bloomfield Bank & Trust Building, Bloomfield, N. J. Telephone: Bloomfield 2-4143
C. M. Baldwin, Manager, 140 South Clarke Street, Chicago 3, Illinois, Telephone: Central 1353

Subsidiary of **UNITED ENGINEERING AND FOUNDRY COMPANY**
Plants at PITTSBURGH · VANDERGRIFT · NEW CASTLE · YOUNGSTOWN · CANTON

WE MAKE ONE GRADE OF
LIGHT MAGNESIUM OXIDE
AND IT IS TOPS!



THIS is the policy of Keasbey & Mattison . . . one and *only one* grade of light magnesium oxide. It reduces your problem to a minimum. Do not be misled by various grades offered.

Always uniform in quality
Always light in weight
Manufactured under precise control from beginning to end
Made to meet compounders' needs
Available in large quantities

ARMY E NAVY
K&M
best in asbestos

KEASBEY & MATTISON
COMPANY, AMBLER, PENNSYLVANIA
One of America's oldest and most reliable makers of asbestos and magnesia products. Founded 1873

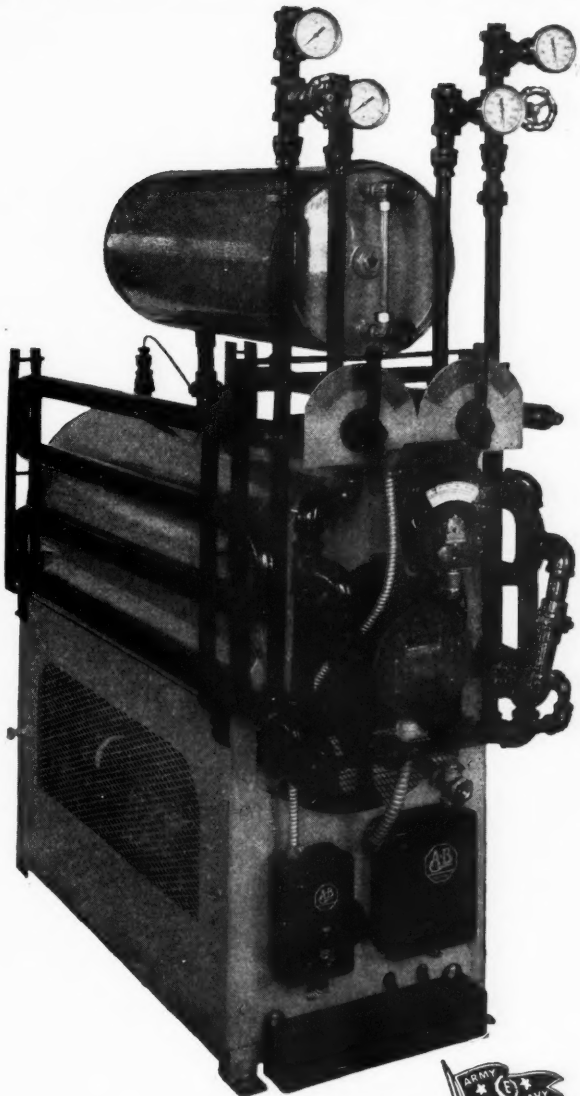
OUR DISTRIBUTOR FOR K&M LIGHT MAGNESIUM OXIDE IS:

AMERICAN CYANAMID & CHEMICAL CORPORATION
30 Rockefeller Plaza, New York 20, N.Y.

WITH SALES REPRESENTATIVES TO THE RUBBER INDUSTRY AND STOCK POINTS:
AKRON, OHIO, Akron Chemical Company
BOSTON, MASS., Ernest Jacoby & Company
CHICAGO, ILLINOIS, Herron & Meyer
LOS ANGELES, CAL., H. M. Royal, Inc.
TRENTON, N. J., H. M. Royal, Inc.

Extruder Temperature Control Unit

- Wide temperature range available
- Sustains high or low extruding temperatures
- Supplies or removes heat from extruder as required
- Multiple circuits can be accommodated
- Hand lever selection of pre-determined extruding temperatures
- Available in two sizes
- Compact



ARMY E NAVY

JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

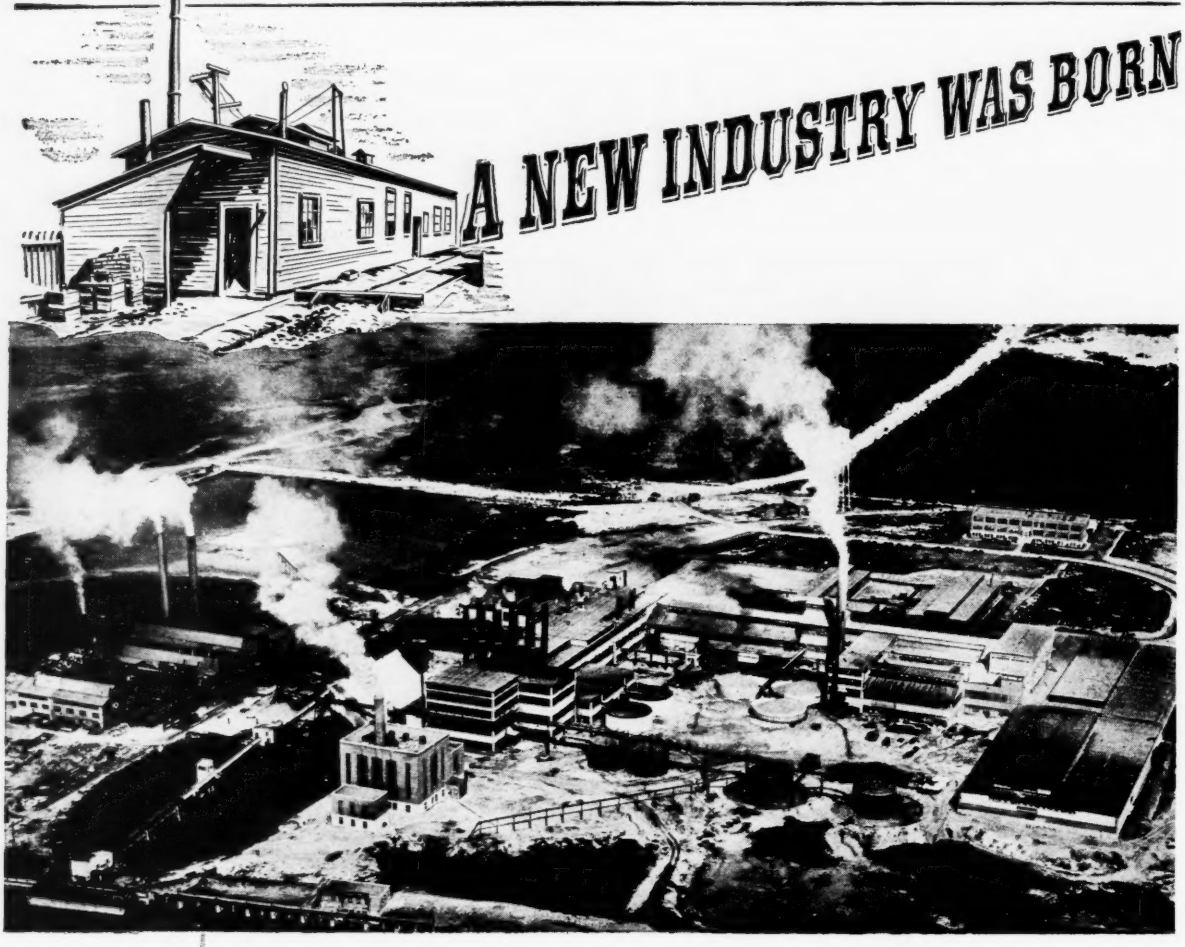
James Day (Machinery) Ltd.
London, England
REgent 2430

Home Office
B. H. Davis J. W. VanRiper
SHerwood 2-8262

Akron, Ohio
J. C. Clinefelter
UNiversity 3726

PATERSON 3, NEW JERSEY

TITANOX... *the brightest name in titanium pigments*



A NEW INDUSTRY WAS BORN

In 1914, back in the days when the guns of World War I started to boom, the first batch of Titanox-B (Titanium Barium Pigment) was turned out in a small pilot plant at Niagara Falls, New York. At that time, titanium was considered "a chemical curiosity" and a rare element.

In 1916, a factory was built in Niagara Falls for the commercial production of titanium pigments which started operation in 1918. Thus, Titanox became the original commercial titanium pigment in the United States.

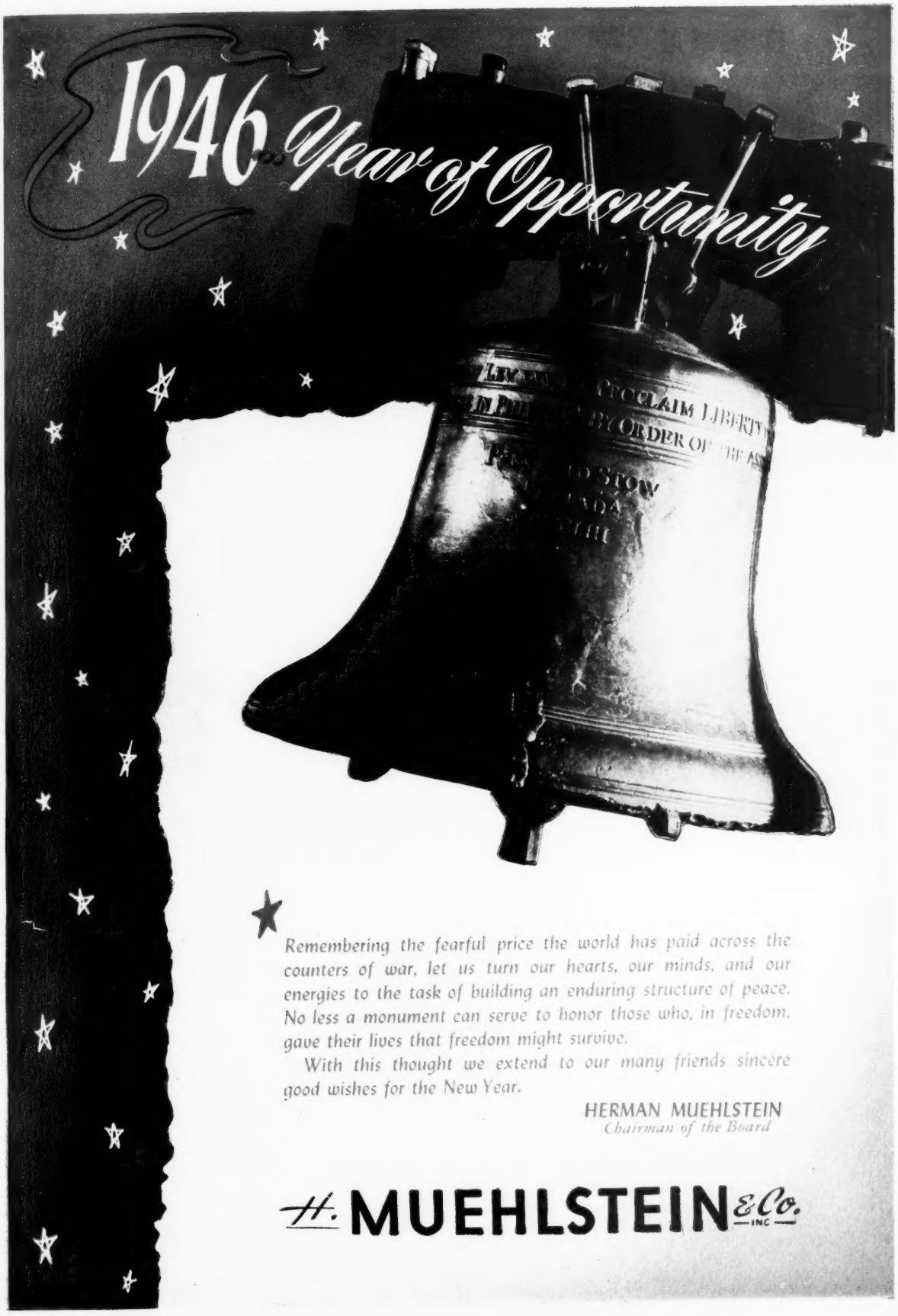
The outstanding qualities of opacity, whiteness and brightness which characterized this original "curiosity" proved themselves, and the demand for Titanox pigments became so great that a second and larger factory was erected in St. Louis, Missouri, in 1923.

Later, another factory was built in Sayreville, New Jersey, where production has been going on uninterruptedly since 1935. At both the latter locations, the factories have expanded considerably to meet increasing demands for Titanox.

Today, the producers of Titanox are proud of their past untiring efforts toward supplying greater quality products and will constantly continue their efforts in this direction.

TITANOX TITANIUM PIGMENT CORPORATION
Sole Sales Agent

111 Broadway, New York 6, N. Y.
104 South Michigan Ave., Chicago 3, Ill.
350 Townsend St., San Francisco 7, Cal.
2472 Enterprise St., Los Angeles 21, Cal.



Remembering the fearful price the world has paid across the counters of war, let us turn our hearts, our minds, and our energies to the task of building an enduring structure of peace. No less a monument can serve to honor those who, in freedom, gave their lives that freedom might survive.

With this thought we extend to our many friends sincere good wishes for the New Year.

HERMAN MUEHLSTEIN
Chairman of the Board

H. MUEHLSTEIN & Co. INC

Silene EF

OFFERS ADVANTAGES IN COMPOUNDING BUTADIENE-ACRYLONITRILE COPOLYMERS

Various manufacturers of these synthetics report excellent results with the Columbia pigment, Silene EF. It is particularly useful in compounding white or light-colored stocks requiring high modulus, hardness, tear-resistance and tensile strength.

For example, one manufacturer reports the following, using a formulation of Butadiene-Acrylonitrile Copolymer, 100.0; Zinc Oxide, 5.0; Stearic Acid, 1.5; Sulfur, 1.75; Benzothiazyl Disulfide, 1.5; Dibutyl Phthalate, 12.5; Coumarone-indene-resin (MP=20° to 30°C.), 12.5; Silene EF, 150.0; and a cure of 45 minutes:

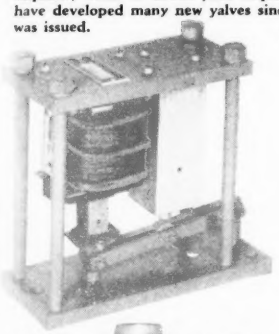
Modulus at 300%	2050 psi.
Ultimate Tensile	2125 psi.
Ultimate Elongation	330%
Shore Hardness	95
Crescent Tear	348

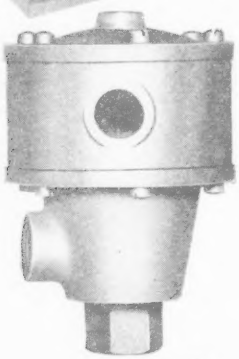
Properties of stocks of lesser loadings and of aged samples were correspondingly satisfactory. The closest approach to a "white carbon black," Silene EF is a white, extremely finely divided, precipitated, hydrated calcium silicate. Its use is constantly expanding for many diversified natural and synthetic rubber products. You are invited to write for information concerning specific compounding problems.

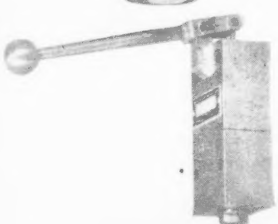
COLUMBIA CHEMICALS

PITTSBURGH PLATE GLASS COMPANY • COLUMBIA CHEMICAL DIVISION
GRANT BUILDING, PITTSBURGH 19, PENNSYLVANIA
Chicago • Boston • St. Louis • Pittsburgh • New York • Cincinnati • Cleveland • Philadelphia • Minneapolis • Charlotte • San Francisco

If the valve action you want is not shown in the factual, easy-to-use, Quick-As-Wink catalog (copy upon request), write us about your requirements. We have developed many new valves since our catalog was issued.







Quick-As-Wink

· HUNT CONTROL VALVES ·

QUICK-AS-WINK VALVE CONTROL Makes the Big Difference in Quality of Raw Stock for Tires and Tubes

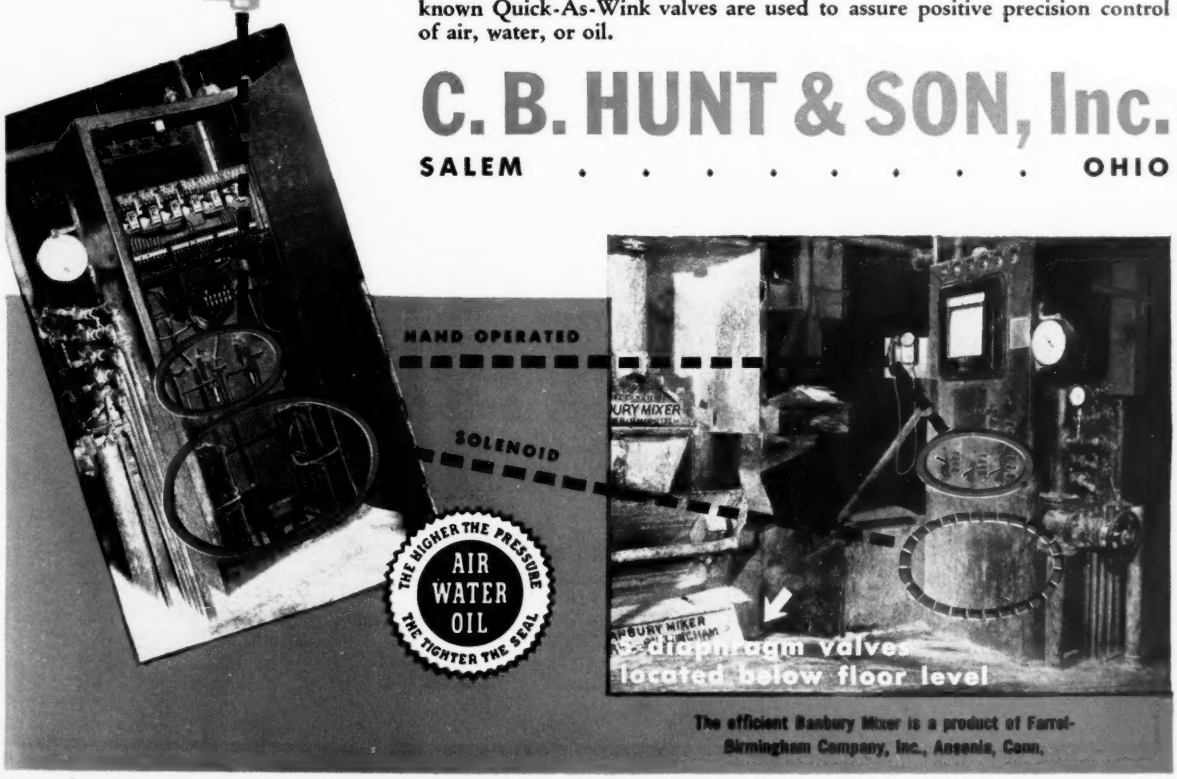
The rugged and compact Banbury Mixer transposes raw stocks of natural and synthetic rubber, plastics, pigments, etc., into workable material for the production of finished products, such as tires, tubes, linoleum, plastics, paints, etc.

In many Banbury Mixers, such as this one and the other Banburys in the plants of Goodyear Tire & Rubber Company, Akron, Ohio, Quick-As-Wink hand operated, solenoid and diaphragm valves form a combination for achieving time and temperature control of each batch. Neither dust nor dirt can harm Quick-As-Wink diaphragm valves, which are unprotected and located below floor level. They are completely housed. There are twelve Quick-As-Wink control valves in all in this mixer; three hand operated; four solenoid; and five diaphragm.

The Banbury Mixer is only one of many applications where the well-known Quick-As-Wink valves are used to assure positive precision control of air, water, or oil.

C. B. HUNT & SON, Inc.

SALEM . . . . . OHIO



The efficient Banbury Mixer is a product of Farrel-Birmingham Company, Inc., Ansonia, Conn.

IN HANDLING
SCRAP RUBBER
WE FOLLOW THE BOOK

ex-pert (ĕks-pûrt'), *adj.* skilful; adroit; dexterous:—*n.* (ĕks'pûrt), one who is skilled or thoroughly informed in any particular kind of knowledge or art; a specialist.

[1]serv-ice (sûr'vĭs), *n.* **1**, the act or occupation of working for another; the rendering of any labor, office, or duty to another; **2**, often in *pl.*, the work done for another; duty required or performed in any office; employment, aid, or kindness rendered to another; **3**, the manner of performing work.

Since the beginning of the rubber reclaiming industry our business has been, primarily, the supplying of scrap rubber, expertly sorted and delivered according to specifications. This "know how" is particularly vital today with the mixture of natural and synthetics in scrap. We know the difference.

THE LOEWENTHAL CO.

Established 1868

JACK SIDER, *President* J. K. McELLIGOTT, *Exec. Vice-Pres.*

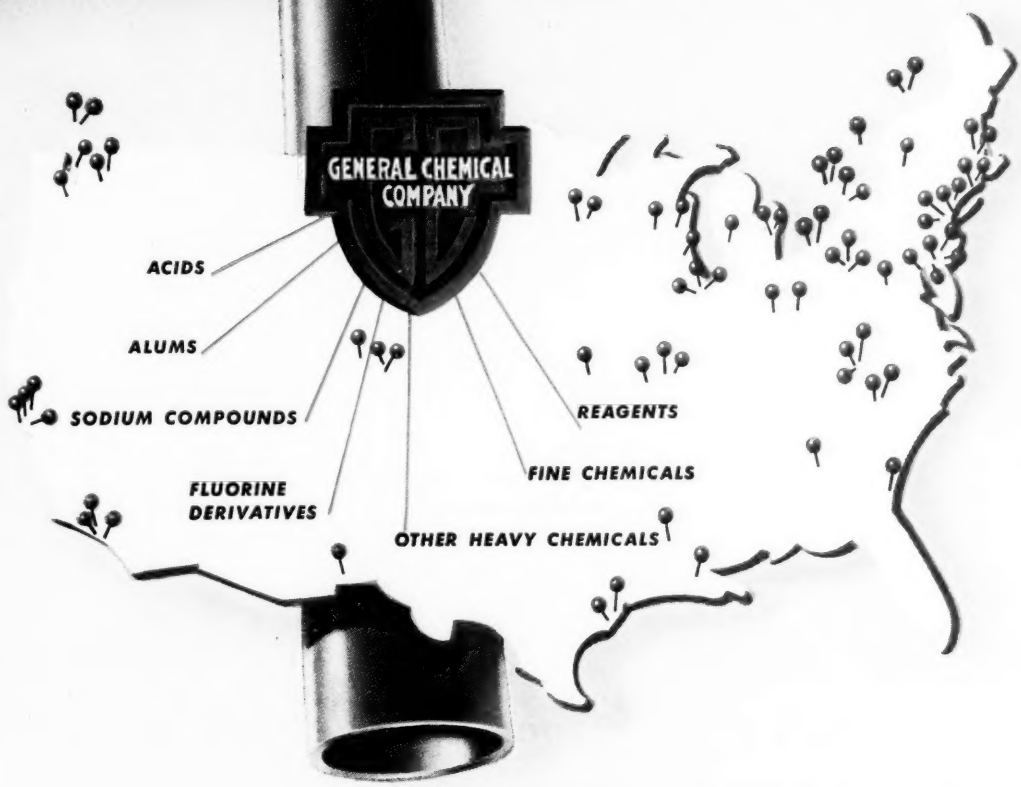
We Solicit Your Inquiries

188 W. RANDOLPH STREET
CHICAGO 1, ILL.

159 CLEWELL STREET
AKRON 5, OHIO

Cable Address: "Gyblowell"

Supply Line for American Industry...



Here is the supply line of Basic Chemicals for American Industry. North, South, East or West . . . wherever the needs are greatest . . . there, too, are the heaviest concentrations of General Chemical *plants, warehouses,* and *technical service offices*—equipped and prepared to meet the chemical demands of the day.

For almost half a century, this supply line has grown ever stronger. It spans the continent . . . reaches out to the most remote locations . . . always maintaining the full flow of a broad and varied range of chemicals so necessary to peak production.

That is why—in every branch of Industry, everywhere—the choice is General Chemical . . . First in Basic Chemicals for American Industry!

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GENERAL CHEMICAL COMPANY
FOR AMERICAN INDUSTRY

GENERAL CHEMICAL COMPANY
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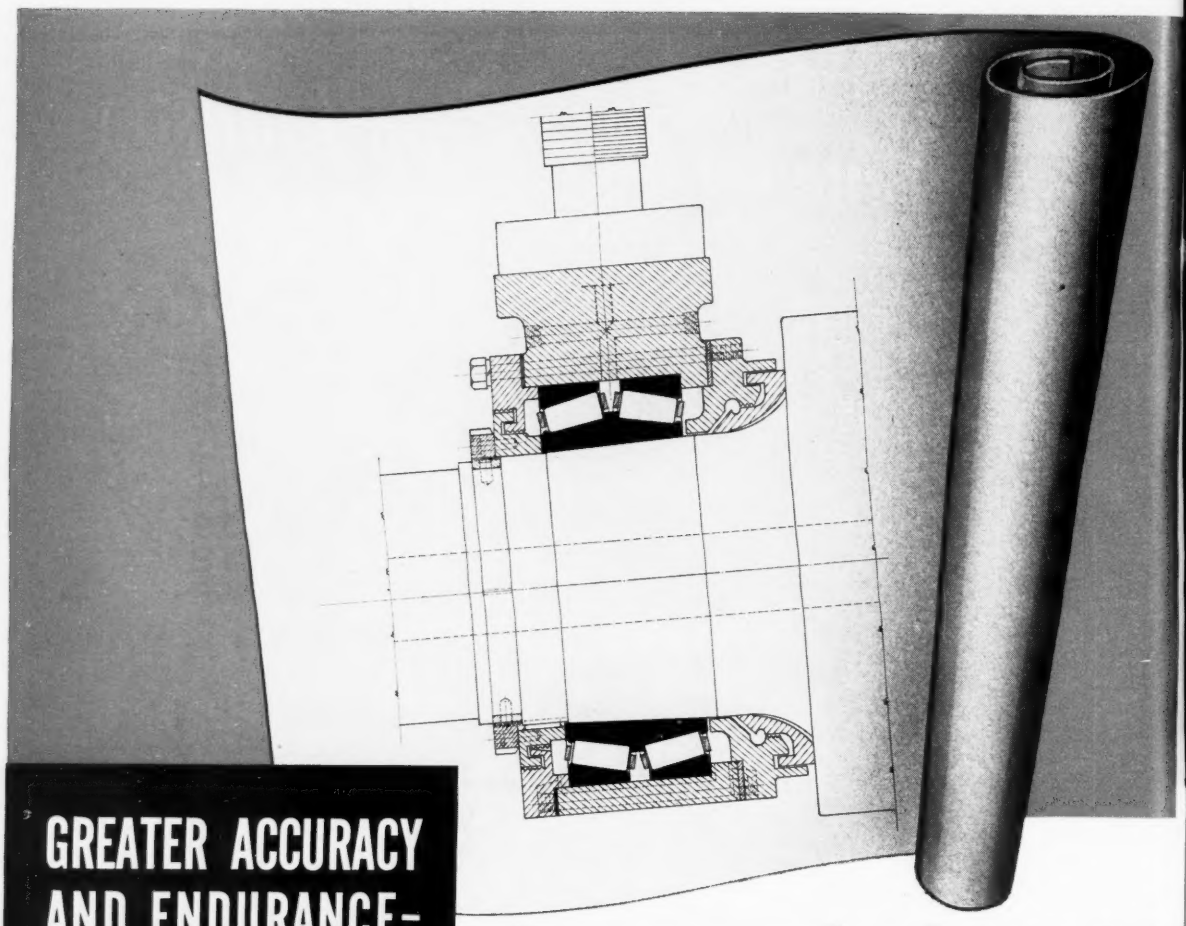
In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver



GREATER ACCURACY AND ENDURANCE-

for your calenders with Timken Balanced Proportion Bearings on the rolls

GREATER ACCURACY because (1) Timken Tapered Roller Bearings are inherently fine precision mechanisms. (2) The tapered design of the Timken Bearing enables extremely fine adjustments to be made during installation in the machine to assure minimum vertical movement of the calender rolls regardless of the operating temperature of the calender. (3) Calender rolls may be reground on Timken Bearings, thus eliminating the need of stripping bearings and boxes from the roll necks.

GREATER ENDURANCE because (1) Timken Bearings are designed to carry all loads — radial; thrust; or both together in any combination. (2) Timken DIT Type Balanced Proportion Bearings as shown in the drawing provide (a) excess load capacity, (b) excess neck strength and maximum rigidity. (3) Timken Bearings are made of Timken Alloy Steel — tops in strength and wear resistance.

To make sure of getting all these advantages in your calenders, see that the trade-mark "TIMKEN" is stamped on every bearing you use. Our engineering department is at your service for consultation at all times. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

Peace-time demands for NEOPRENE COMPOUNDED PRODUCTS

give new importance to CALCINED MAGNESIA

made under controlled temperature

IT'S UNIFORM

1. UNIFORM wetting power and ease of dispersion
2. UNIFORM dispersion with improved stabilizing effect
3. UNIFORM quality maintained in moisture-proof packaging

"Give us more Neoprene compounded products." Every day the demand increases as war-time experience with Neoprene becomes known.

The sharp rise in the use of Neoprene for many new products makes it doubly important for Neoprene compounders to know the importance of selecting a uniform Calcined Magnesia.

And one vital factor in the uniformity of Calcined Magnesia is controlled temperature in manufacturing. Baker gives you this plus with specially built electric ovens. This electrically controlled calcining process gives definite uniformity and also eliminates possibility of oxide contamination from products of combustion.

The indexes of chemical purity for Calcined Magnesia are extremely high. The indexes for iron and calcium are extremely low. The processing of neoprene is still a very sensitive operation. That is why you will be interested in the distinctive features of Baker's Calcined Magnesia, shown in the panel.

We urge you to test Baker's Magnesium Oxide (Neoprene grade). Test it for its ease of dispersion—its ease of compounding of stock—its rate of cure — its tensile strength — and its plasticity. Learn why Baker's light Calcined Magnesia is better. Send for free samples.

J.T. Baker Chemical Co., *Executive Offices & Plant:* Phillipsburg, N.J.
***Branch Offices:* New York, Philadelphia, Boston and Chicago.**

Baker's *Light* CALCINED MAGNESIA

PICCOUMARON

a series of Para-Coumarone Indene Resins

Made in a variety of grades for all types of Natural-Reclaimed-Synthetic

Rubber

Piccoumaron resins are available in ten melting points from 10°C to 120°C plus. Colors vary from light (1½—3½ on the coal tar resin scale) to extra dark (12-16). These resins have been found particularly well suited for the manufacture of all types of rubber.

Write for specification and application data.

Due to heavy demands for Picco Products, we are sometimes unable to guarantee prompt deliveries of certain types. However, we will be glad to help you select the proper types and grades for your particular use, and schedule the earliest possible delivery for your orders.

Write for specification and application data

Pennsylvania PICCO

INDUSTRIAL CHEMICAL CORPORATION

CLAIRTON, PENNSYLVANIA

Makers of: Coumarone Resins · Coal Tar Naphthas · Styrene Resins · Rubber Plasticizers · Reclaiming Oils · Terpene Resins

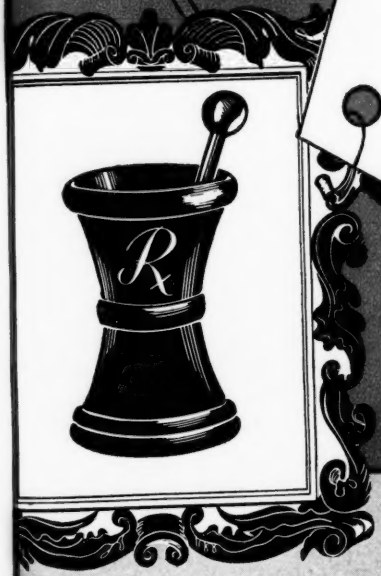
Distributors to the Rubber Industry—Standard Chemical Company · Akron, Ohio

PREPARED AS A PRESCRIPTION

LOTOL

REG. U.S. PAT. OFF.

Compounded Latex



★ Dipping ★ Coating ★ Saturating ★ Bonding

NAUGATUCK CHEMICAL

Division of United States Rubber Company

1230 AVENUE OF THE AMERICAS · NEW YORK 20, N. Y. BRANCHES: AKRON · BOSTON · DETROIT · NAUGATUCK

★ Submit your problem for Analysi

SKELLYSOLVE
for the RUBBER INDUSTRY

There are six different types of Skellysolve which are especially adapted to various uses in the rubber industry, for making rubber cements, and for many different rubber fabricating operations. Skellysolve offers many advantages over benzol, rubber solvent gasoline, toluol, carbon tetrachloride, etc. Our Skellysolve Technical Fieldmen have aided many manufacturers in developing formulas for new or improved products, and in "shooting" trouble of a solvents nature. Write or wire today for full information.

Here's why!

Skellysolve is unequalled in purity, uniformity, and stability. Because we have long pioneered in the development of extra-quality industrial naphthas, the name Skellysolve assures you of the finest characteristics, closest cuts, constant uniformity, and low evaporation losses.

Here's why!

Source of supply is unequalled for dependability and swiftness. We have the raw materials, the plants and equipment, the experience, and even more important—the *will* to serve you! Further, Skellysolve is shipped in cars used for no other purpose. There's no chance of contamination or mixture with other materials.

Here's why!

A wide variety of special naphthas assures you of the right type of Skellysolve for your particular operation—assures better products, more uniform products, more economy in production.

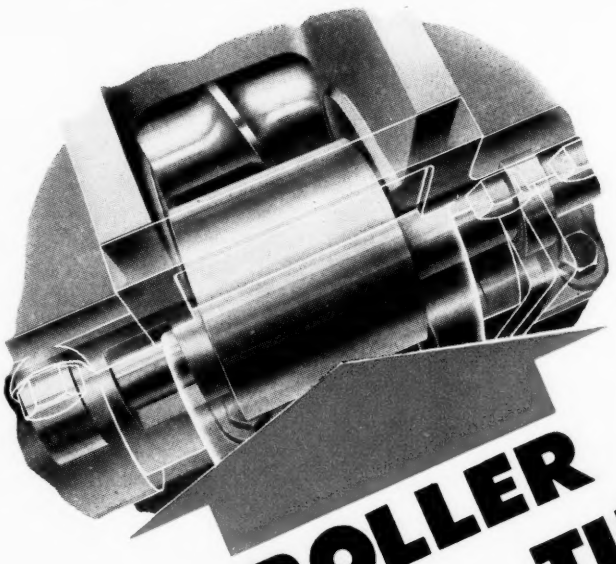
Here's why!

New technical developments make Skellysolve even finer today than in the past. You'll save time, money, and trouble by checking Skellysolve properties and prices first. Write or wire for information.

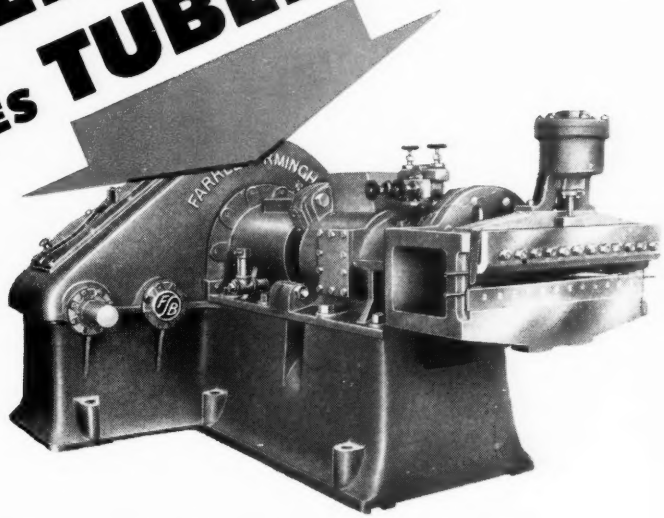
SKELLY

SKELLYSOLVE

SOLVENTS DIVISION, SKELLY OIL COMPANY
SKELLY BLDG., KANSAS CITY, MISSOURI



HOW THIS ROLLER INCREASES TUBER PRODUCTION



10% to 25%

An exclusive, "designed-in" feature of the Farrel Roller-Feed Tubing and Straining Machine, this roller, mounted on one side of the hopper and driven from the main spindle, automatically feeds an unvarying supply of stock to the screw.

This method of constant uniform feeding has resulted in *increased production rates of from 10% to 25% over conventional type machines.* Production figures show from 120 pounds per hour per RPM on a 6.00 x 16 tread to 165 pounds per hour per RPM on an 8.25 x 20 tread.

In addition to increased output there are several other *Roller-Feed* advantages which are of "dollar importance" to you.

IMPROVED QUALITY

Crowding action of the *Roller-Feed* eliminates trapped air and keeps a constant amount of stock in the chamber. This assures an extruded section of greater density and uniformity than is otherwise possible.

LESS SKILL REQUIRED FOR BEST RESULTS

Since correct stock pressure in the screw is maintained automatically, the uniformity of density and gauge is not dependent upon the operator.

GREATER OPERATING SAFETY

The operator does not risk fingers or hand by manually starting the stock into the screw. The strip is fed in automatically by the *Roller-Feed.*

Complete information on the special features, versatility, and range of sizes of this high-speed, low-temperature production unit is contained in the new Farrel bulletin No. 175. Send for your free copy today.

FARREL-BIRMINGHAM COMPANY, INC.
Ansonia, Conn.

Plants: Ansonia, Derby and Stonington, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Pittsburgh, Akron, Los Angeles, Tulsa, Houston, Charlotte

FB-273

Farrel-Birmingham

If you add to the native excellence of GN NEOPRENE a light touch of NEOPRENE PEPTIZER P-12, the result—from a processing and stability viewpoint—will be astonishing.

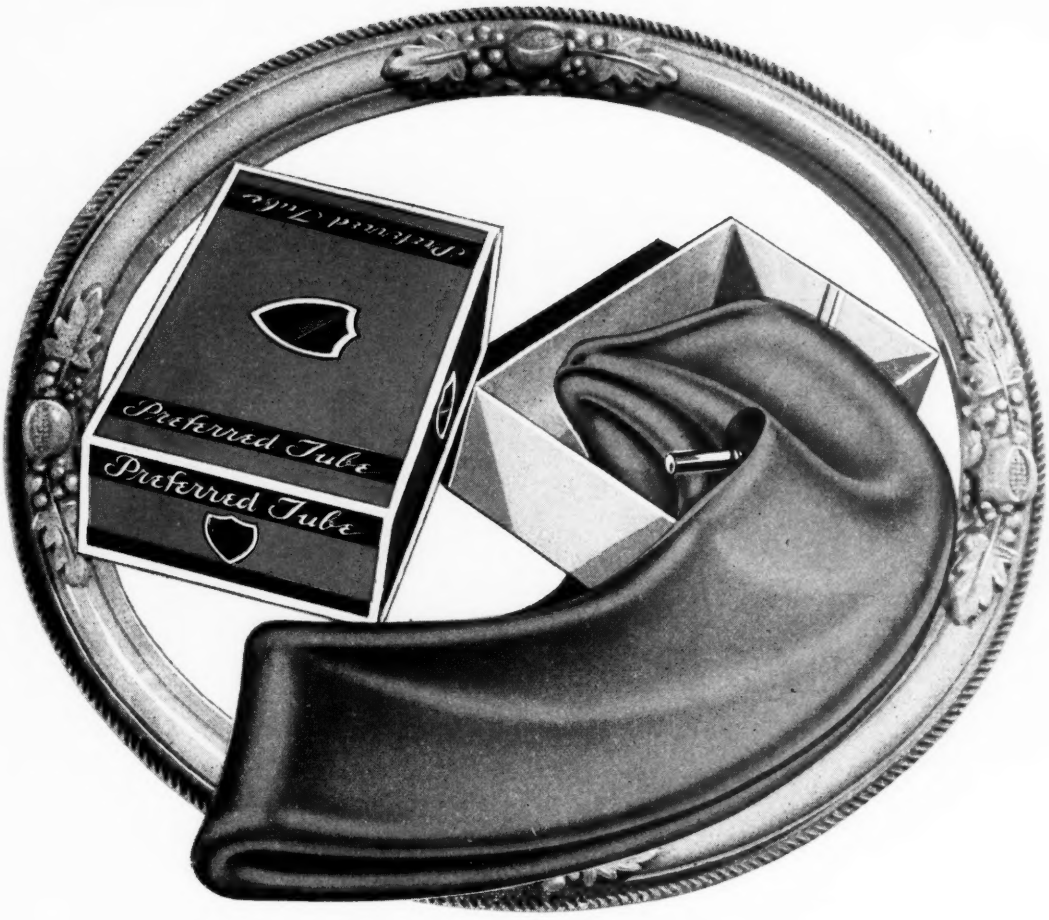
Write us for Technical information. Or, better yet, ask anyone who is using it!

THE CALDWELL COMPANY

2412 First Central Tower
AKRON 8, OHIO

Trade Mark Registered

Patent Applied For



AN OLD-FASHIONED PORTRAIT COMES TO LIFE

It has been a memory — a happy memory to millions of motorists. It was a beauty as they remembered it, worthy of admiration for its handsome appearance and fine, serviceable life. . . A cherished picture, yes; but it HAS come back to reality. With the release of Butyl rubber and the availability of SILENE EF a better inner tube is the order of the day. SILENE EF makes that better tube possible. It assures success in color compounding for red tubes. . . SILENE EF is essential in non-black Butyl tube compounds to give them the processing qualities, and the good cured physical properties unobtainable when clays or whitings are used alone as the principal loading pigment.

SILENE EF

STANDARD Chemical Company

General Offices: AKRON 8, OHIO

New England: 335 Chamber of Commerce Bldg., Boston, Mass.
Mid-West: 2724 W. Lawrence Ave., Chicago, Ill.

PELLETEX and GASTEX, the leading semi-reinforcing furnace blacks are taking a prominent place in the re-conversion picture.

Send for technical bulletins mentioning the application in which you are interested.

MANUFACTURER • DISTRIBUTOR

GENERAL ATLAS CARBON CO.

PELLETEX

GASTEX

PAMPA, TEXAS · GUYMON, OKLA.

HERRON BROS. and MEYER

NEW YORK, N.Y. AKRON, OHIO

RUBBER H AND M PIGMENTS Chemicals

BAKER PLASTICIZERS

IMPART

Retained Flexibility

TO

VINYL RESINS CELLULOSE RESINS

PHENOL FORMALDEHYDE RESINS

MELAMINE RESINS STYRENE RESINS

UREA FORMALDEHYDE RESINS

AND

GRS GRN GRM

THE BAKER CASTOR OIL COMPANY

Established 1857

120 Broadway, New York 5, New York

Chicago, Illinois Los Angeles, California

Inexpensive Dark Resins

AVAILABLE FOR SHIPMENT IN QUANTITY

PARADENE #1, #33, #34, #35

Melting points range from 20° to 100° C. Readily soluble in petroleum and coal-tar (aromatic) solvents.

465 RESIN

Used in manufacture of adhesives, concrete curing compounds, electrical insulation, floor tile, linoleum, paints and varnishes, pipe coatings, textile coatings and in compounding of natural and synthetic rubber.

Melting point between 105° and 120° C. Soluble in aromatic solvents and partially in petroleum solvents.

NUBA #1, #2, #3X

Used in the manufacture of adhesives, box toes, ethyl cellulose lacquers, impregnations, linoleum, floor tile, sealing compounds, varnishes and in the compounding of natural and synthetic rubber.

Melting points range from 80° to 135° C. Soluble in aromatic solvents. They are cohesive and have high molten viscosity.

Used in the manufacture of adhesives, binders, box toes, briquettes, composition insulating blocks; filling, stiffening, molding and thermal insulating compounds; leather dressings, steep-roof coatings and for compounding natural and synthetic rubber.

Write for samples and booklet describing these resins.

NEVILLE

THE NEVILLE COMPANY
PITTSBURGH, 25, PA.
Chemicals for the Nation's Vital Industries

BENZOL • TOLUOL • XYLOL • TOLLAC • NEVSOL • CRUDE COAL-TAR SOLVENTS
HI-FLASH SOLVENTS • COUMARONE-INDENE RESINS • PHENOTHIAZINE • TAR PAINTS
RUBBER COMPOUNDING MATERIALS • WIRE ENAMEL THINNERS • DIBUTYL PHTHALATE
RECLAIMING, PLASTICIZING, NEUTRAL, CREOSOTE, AND SHINGLE STAIN OILS

A-20

CHECK THESE 2 PERFORMANCE PROVED CEMENTS AGAINST YOUR NEEDS! *

N-100 SELF-CURING ADHESIVE *

for cementing together or one to another raw fabrics, coated fabrics, molded parts, leather, wood, paper, tubing, sponge, channel-stock, stripping and sheet material... *as a Sealant* for rubber and synthetic valve seats, gaskets, etc.

A Two-Part Neoprene Base Formula of Brush Viscosity and Neutral in Color

...Extremely high green strength...Good strength after standing 3 to 4 hours...Optimum cure reached in 10 days at 68-70°F (in 16 hours at 100-125°F; in 1 hour at 255-260°F)... Excellent water, oil, flame and delamination resistance...Chemical resistance to acetic acid, alcohols, aliphatic hydrocarbons, ammonia, calcium chloride, copper sulphate, fatty acids, hydrochloric acid, oxalic acid, phenol, sodium hydroxide, sulfuric acid...Extremely high shear strength...Contains no Benzol.

N-800 NEOPRENE PUTTY *

for Filling rubber, neoprene and other synthetic rubber parts . . . *for Repairing* wire cable . . . *as a Binder . . . and for Caulking.*

A Two-Part Neoprene Base Formula of Putty Consistency and Black in Color

. . . Bonds without Primers . . . Optimum cure reached in 10 days at 68-70°F (in 16 hours at 100-125°F; in 1 hour at 255-260°F)...High dielectric strength...Excellent water, oil and flame resistance . . . Chemical resistance to acetic acid, alcohols, aliphatic hydrocarbons, ammonia, calcium chloride, copper sulphate, fatty acids, hydrochloric acid, oxalic acid, phenol, sodium hydroxide, sulfuric acid.

* Both of these formulas have been performance-proved in important war production work over a period of several years.

Address all inquires to the Union Bay State Chemical Company, Rubber Chemicals Division, 50 Harvard St., Cambridge 42, Massachusetts.

UBS

UNION BAY STATE *Chemical Company*

Serving Industry with Creative Chemistry

ORGANIC CHEMICALS · SYNTHETIC LATEX · SYNTHETIC RUBBER
PLASTICS · INDUSTRIAL ADHESIVES · DISPERSIONS
COATING COMPOUNDS · IMPREGNATING MATERIALS · COMBINING CEMENTS

What's the toughest vulcanizing job in the rubber business?

MAYBE you have tougher ones than this. But vulcanizing 60-foot lengths of 12-inch hose is surely one of the toughest. Previous attempts at curing such long sections had produced uncured spots. The recommendations of our specialists on rubber applications included the use of a thermo-compressor, controlled by a Taylor Fulscope Time Schedule Temperature Controller. This arrangement (see sketch below) provided the necessary heat distribution to assure uniform curing throughout . . . Again the solution resulted from the versatility of Taylor Instruments, plus Taylor "know-how" acquired through years of experience in working with the rubber industry on its many processing problems.

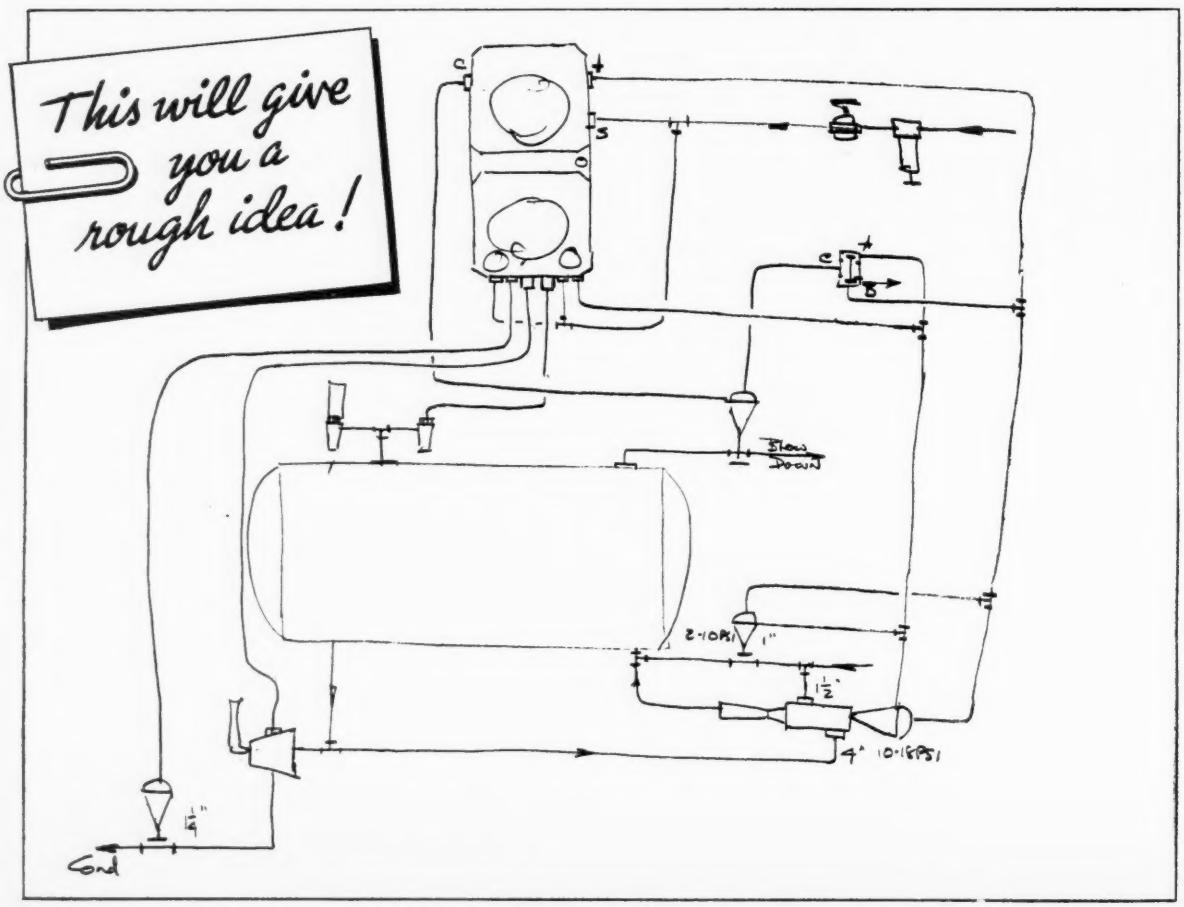
The Taylor Time Schedule Controller *accurately* and *automatically* holds any vulcanizing operation to whatever predetermined curing schedule you may have worked out. Just push a button and it gives you a controlled rate of rise to curing temperature, holds this temperature uniformly until the end of the cure, then shuts off the steam and opens the blow-down valve.

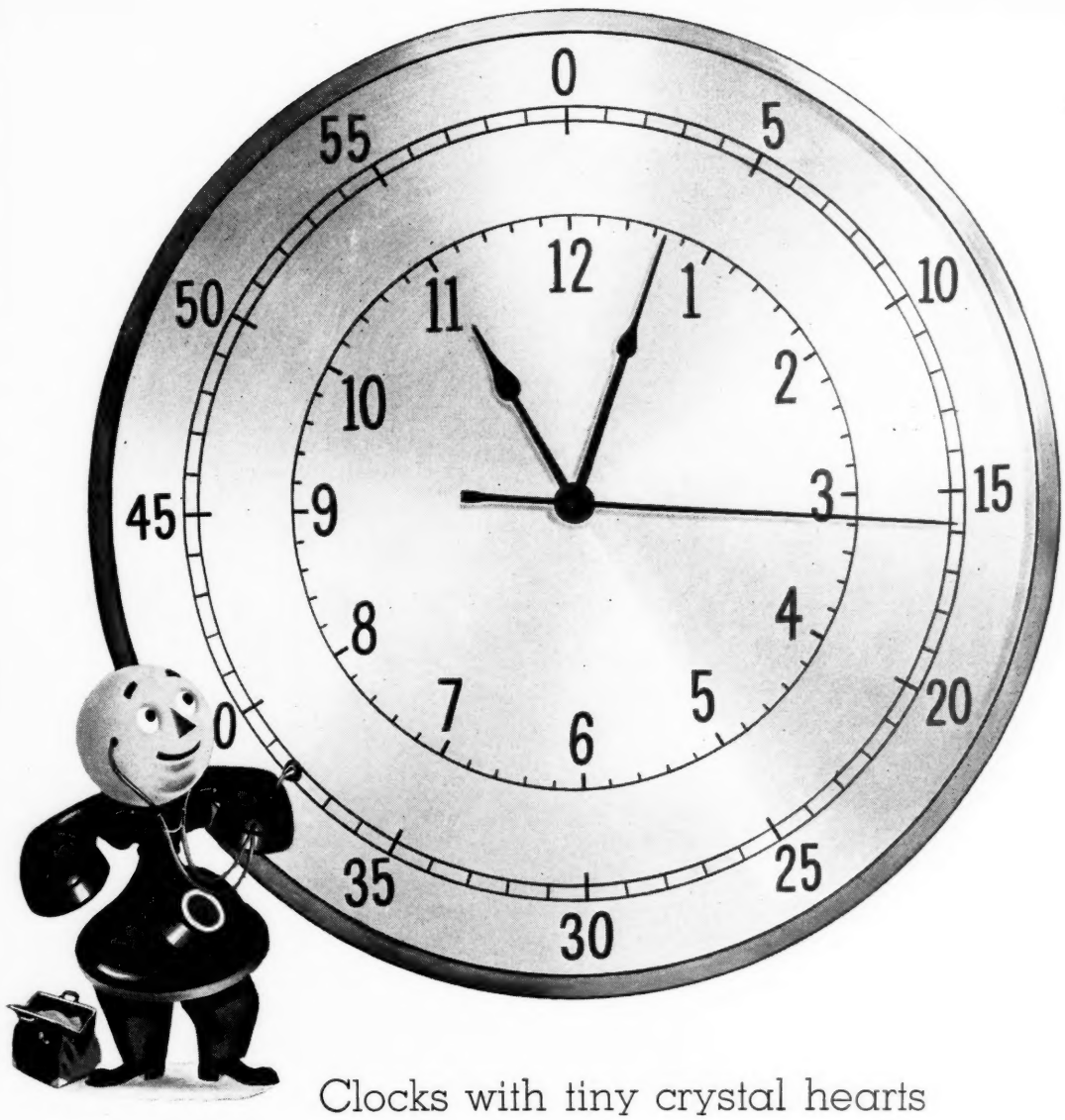
This Taylor Time Schedule Controller is one of the most versatile and flexible instruments we have ever made. It's a "Mechanical Brain" wherever you have predetermined time-temperature or time-pressure schedules or combinations of both. And don't overlook the priceless ingredient of instrument application experience which is available to you whenever you call in the Taylor Field Engineer. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.

ARMY E NAVY

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY





Clocks with tiny crystal hearts that beat 100,000 times a second

CRYSTAL HEARTS beat time in Bell Telephone Laboratories, and serve as standards in its electronics research. Four crystal clocks, without pendulums or escapements, throb their successive cycles without varying by as much as a second a year.

Precise time measurements may seem a far cry from Bell System telephone research, but time is a measure of frequency, and frequency is the foundation of modern communication, whether by land lines, cable, or radio.

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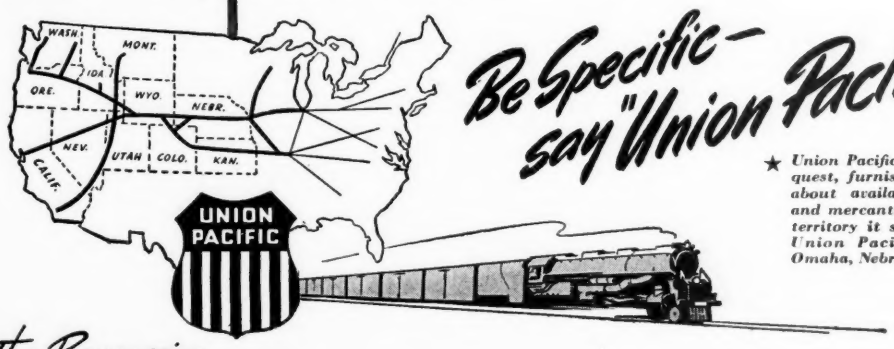

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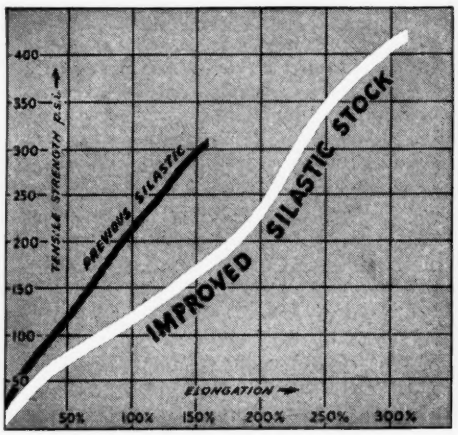

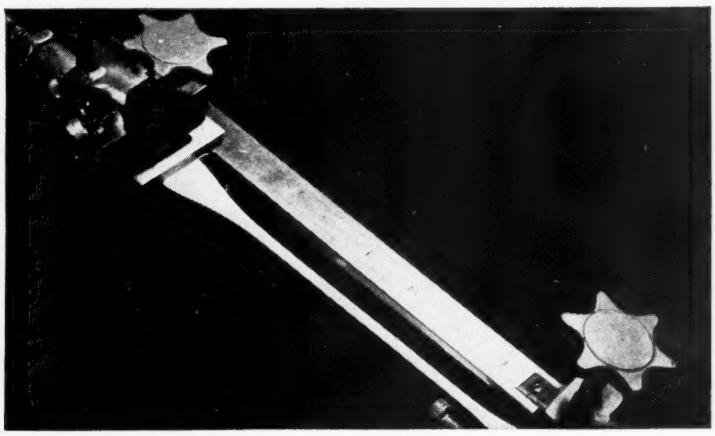

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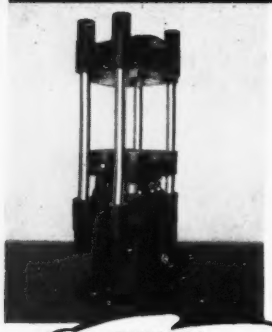

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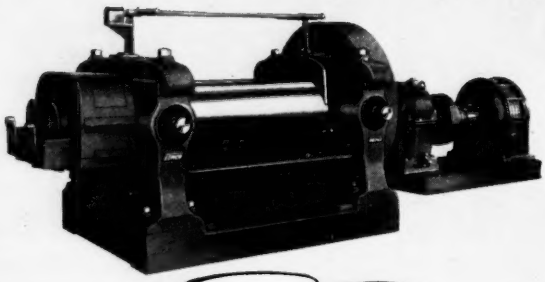

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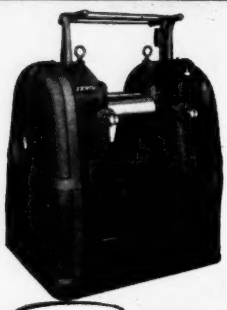

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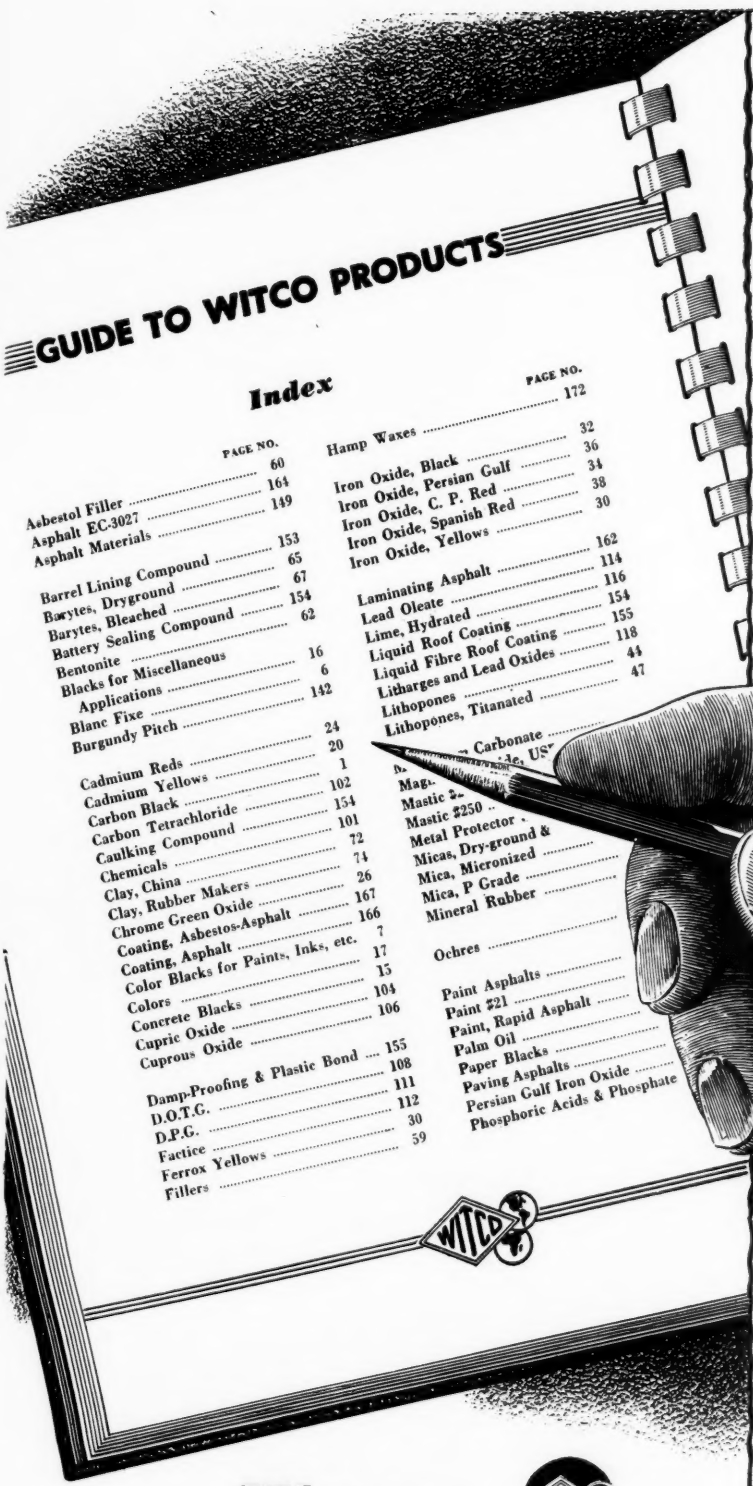

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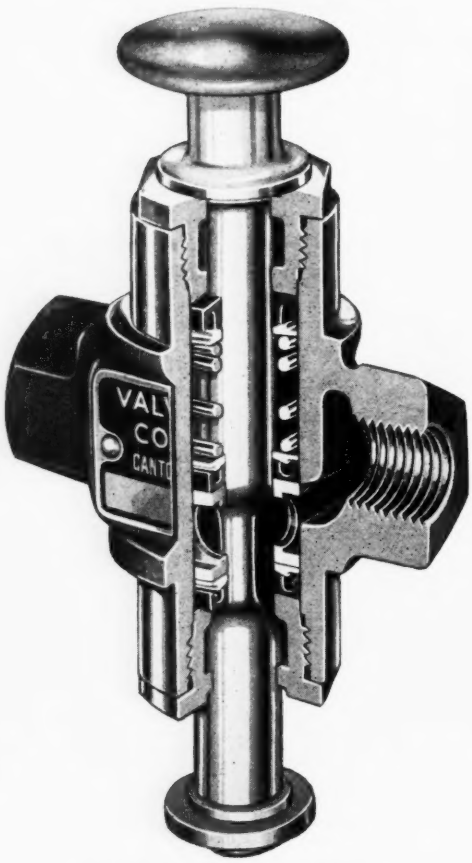

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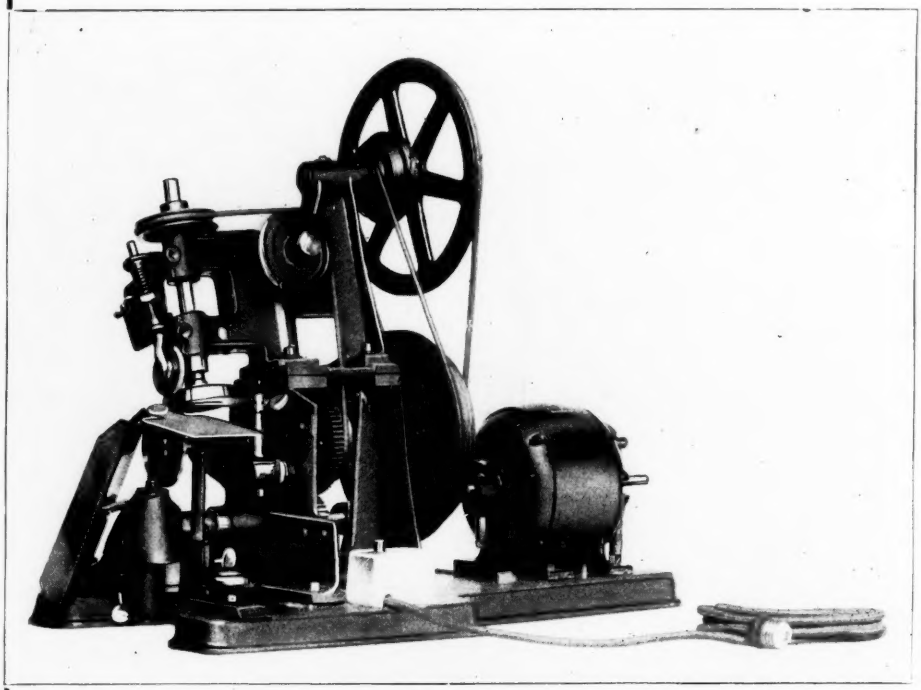

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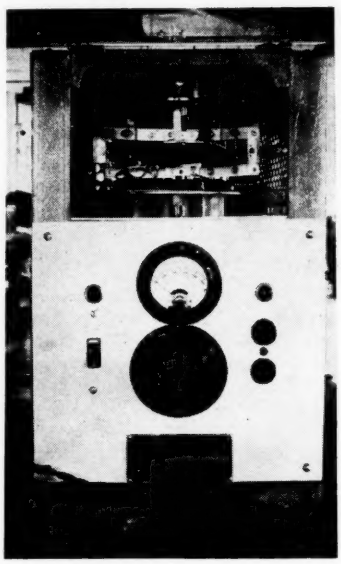


Fig. 1. A Small 400-Watt High-Frequency Generator

B. F. Goodrich Co.

Heating and Vulcanizing Rubber and Similar Resins with High-Frequency Current[1]

V. L. Smithers[2]

BEFORE the Rubber Technology Conference, held in London in 1938, H. J. Leduc, a French engineer, reported the results of his early experimental work in applying high-frequency currents to heating and vulcanizing rubber. The American rubber industry embraced this development with its customary alacrity. The application of this revolutionary process was temporarily halted, however, because of the urgency of rubber products for the war effort and because of the fact that the production of high-frequency generators encroached on the production of AAA priority items for the Armed Services, such as radar, radio equipment, etc.

Since the termination of active hostilities, conditions have greatly improved. At the present time manufacturers of high-frequency generators are in excellent position to make reasonably prompt delivery.

Rubber goods manufacturers are viewing with concern the enormous expansion of manufacturing facilities promoted during the past four years. They are cognizant that, after the pent-up demand for rubber products has been fairly well satisfied, competition will be even keener than prior to the war. This fact spurs them to search not only for new products, but also for new and better ways to do things.

Advantages and Applications of High-Frequency Heating

What is there about this new process which arouses the interest of industry? "Electronics," like "radar," is a magic word which stimulates the imagination of the laymen; but it takes far more than magic words to arouse the interest of a manufacturer to the point of investing hard money in a new process! It must show competitive advantage and enable him to expand his sales in the face of increasingly difficult markets.

This use of high-frequency current offers three distinct advantages:

1. A substantial reduction in curing and molding time.
2. A product having uniformity of cure throughout.
3. A distinct improvement in the physical properties of the compound.

The history of the rubber industry is one of constant struggle for more and more production per unit of equipment. Because of the important role organic accelerators have played in reducing vulcanizing time, their introduction is rightly hailed as a major milestone of progress in efficient rubber processing. Today most factory stocks are just as "hot" as will permit handling with safety in the preparation departments, but still the urgent cry is for more and more vulcanizing speed.

A review of several commercial applications furnishes striking examples of time-saving possibilities of the electronic process.

Fig. 2.—High-Frequency Heating Unit and Press Installation Used

[1] Presented before the Chicago Rubber Group, Oct. 12, 1945.
[2] President of V. L. Smithers Laboratories and vice president and general manager of Industry Inventions, Inc., both of Akron, O.

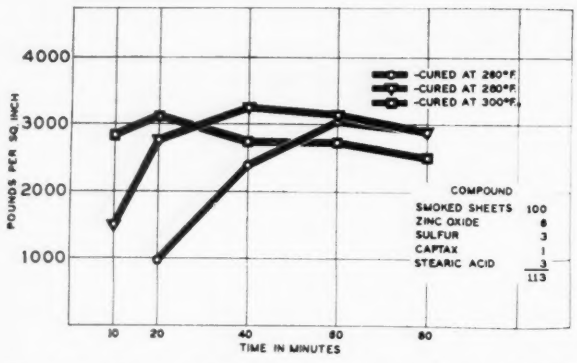


Fig. 3. Regular Laboratory Slab Press Cures—Effect of Curing Temperature on Tensile

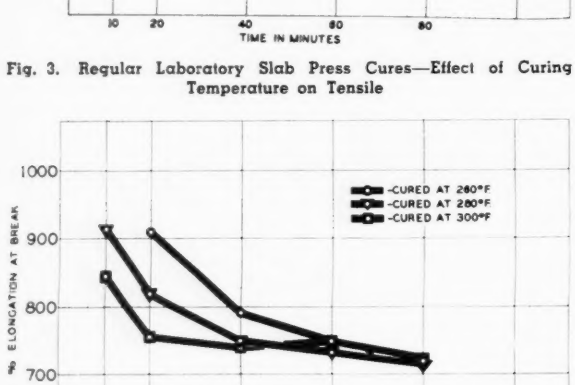


Fig. 4. Regular Laboratory Slab Press Cures—Effect of Curing Temperatures on Elongation

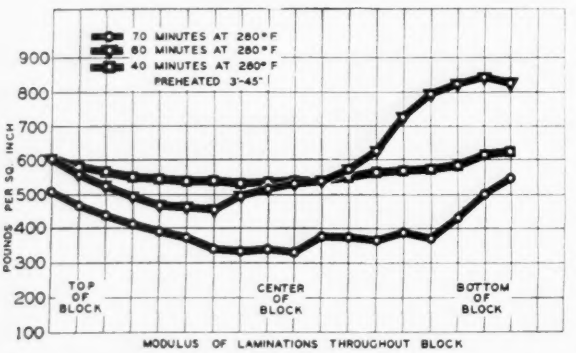


Fig. 5. Regular Laboratory Slab Press Cures vs. Press Cures Preceded by High-Frequency Preheat—Effect of Curing Time on 500% Modulus

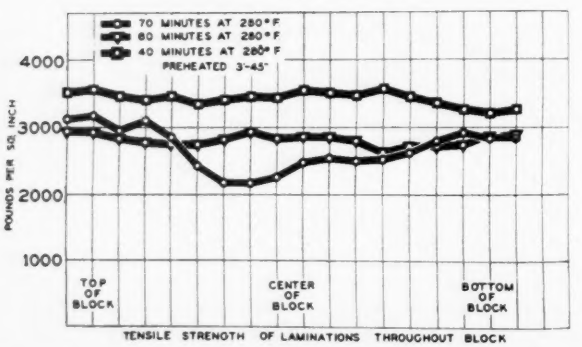


Fig. 6. Regular Laboratory Slab Press Cures vs. Press Cures Preceded by High-Frequency Preheat—Effect of Curing Time on Tensile

In one instance the vulcanizing time for tank track blocks was cut exactly in half by a short period of preheating before placing into the mold.

In the manufacture of large hard-rubber caster wheels, the mold cycle, which included heating, curing, and cooling, was reduced from 305 minutes to 90 minutes on the first try. Additional reductions were indicated by slight modifications in the compound.

The manufacture of foamed latex sponge is a natural for the application of the process. Today full-size foamed latex mattresses are being produced in five minutes, where 30 to 35 minutes were required by the old processes. In addition to the saving in vulcanizing time, the drying time has been reduced to approximately one-seventh of what was formerly required. One manufacturer has in operation a 125-kilowatt unit devoted exclusively to the production of large foamed latex products.

Ordinarily this process is considered of greatest advantage where rubber articles having relatively heavy cross-sections are produced. That this is not necessarily so is illustrated by the production record of the 400-watt unit shown in Figure 1. This small generator increased press output fivefold. A short preheating so improved the quality of the synthetic compound that cooling of the finished product before stripping was eliminated.

Either by nature or through years of exacting training, the rubber technologist is a wary individual. He must be shown—but he is receptive.

Experimental Test Results

To furnish data which would provide some means of gaging the advantages claimed for the electronic process, a series of simple tests was conducted in the V. L. Smithers Laboratories using the high-frequency heating unit and press installation shown in Figure 2. The pure-gum natural rubber compound listed below was selected because it is planned to use the results of this work as a base for future studies of the effect of loading with different pigments:

Table 1. Pure Gum Compound Formula

Smoked sheets	100.
ZnO	6.
Sulphur	3.
Captax	1.
Stearic acid	3.

Since the first need was for complete information concerning the curing characteristics of the compound, regular laboratory slab press cures were made at press temperatures of 260, 280, and 300° F. for periods of time ranging from 10 to 80 minutes. Tensile at break data are charted on Figure 3 and show that optimum cures are at 60, 40, and 20 minutes, respectively.

An examination of Figure 4, showing "Elongation at Break," will indicate that elongations of 750% are obtained at 60, 40, and 20 minutes at curing temperatures of 260, 280, and 300° F., respectively. After examining these results, it was decided to make future cures at 280° F. and to accept 3,000-pound tensile and 750% elongation as satisfactory physical properties at optimum cures.

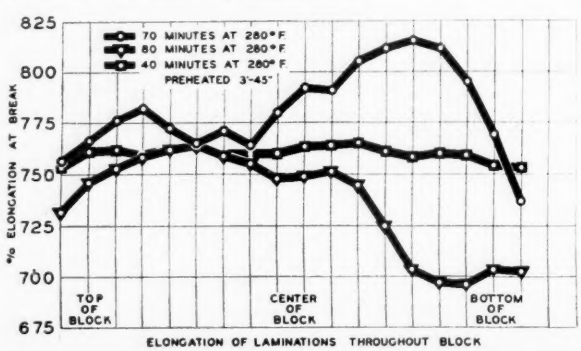


Fig. 7. Regular Laboratory Slab Press Cures vs. Press Cures Preceded by High-Frequency Preheat—Effect of Curing Time on Elongation

A mold with a cavity measuring six by six inches with a depth of 1.5 inches was procured. To facilitate the study of state of cure through the block, the stock was calendered to 0.075-inch gage and plied up to proper thickness with two piles of 0.001-inch gage cellophane between each lamination.

First, straight press cures for 60, 70, and 80 minutes at 280° F. were made. The 60-minute cure was so badly undercured that it was not possible to obtain test data. The results of tests for stress at 500% elongation, and tensile and elongation at break are shown on Figures 5, 6, and 7. There is nothing particularly surprising about these data. The 70-minute cure shows a spread of tensile approximately 3,000-pounds at top and bottom of block, to about 2,200-pounds at the center. Normal spread of modulus and elongation was obtained.

The tensile at break for the 80-minute cure was satisfactorily uniform throughout the block, but stress at 500% modulus varied from a low of 450 p.s.i. near the center to a high of slightly under 850 p.s.i. at the bottom. Likewise, elongation at break varied from 760% at a point about one-third way from the top of the block to a little under 700% at the bottom.

For comparison with these data a block was preheated electronically for three minutes, 45 seconds, to 247° F., then press cured 40 minutes at 280° F. Results of tests made on this block are also shown on charts, Figures 5, 6, and 7. Comparison of the data shows a greater uniformity of cure in the electronically preheated block, and a vastly superior product, as indicated by a comparison of tensiles. The results are tabulated below:

TABLE 2. PHYSICAL TEST DATA COMPARISON

	Block 1 Electronically Preheated 3'45" 40' Press Cure @ 280°	Block 2 70' Press Cure @ 280° F.	Block 3 80' Press Cure @ 280° F.
Tensile At Break p.s.i.			
High	3570	3170	2947
Low	3208	2192	2632
Average	3425	2680	2814
Standard Deviation*	178	371	208
Elongation At Break			
High	766	815	764
Low	752	737	696
Average	760	781	736
Standard Deviation*	14	20	72
Stress @ 500% Elongation p.s.i.			
High	612	545	842
Low	535	332	455
Average	565	405	604
Standard Deviation*	45	98	145

* Calculated according to "A.S.T.M. Manual on Presentation of Data." American Society for Testing Materials, Philadelphia, 1943 (Reprinted).

Summary and Conclusions

A brief summary of the above test data develops these facts:

a. The physical properties of the compound in the block electronically preheated were superior to those in the press-cured test blocks.

b. The electronically preheated block was more uniformly cured throughout.

c. The curing time was cut approximately in half.

The above preheating job is the simplest application of this process. No special preparations were made to achieve the above results. The pure gum compound is one of the most difficult to handle, and later tests indicated that with some preliminary work or with a loaded compound, the preheating time could have been appreciably reduced.

It would be unwise not to state candidly that there are two major problems to be disposed of before satisfactory commercial applications for complete electronic press curing can be realized.

Number 1 problem is to find satisfactory dielectric mold materials. Their characteristics must be such that they will not heat faster than the compound. Furthermore a satisfactory mold material must have sufficient tensile strength to withstand the heavy lateral pressures developed in solid and hard-rubber press molding; it must have good compressive strength; it must not soften at vulcanizing temperature or deteriorate with repeated heating and cooling; and it must not be brittle to the point of breaking or chipping with ordinary handling incidental to curing.

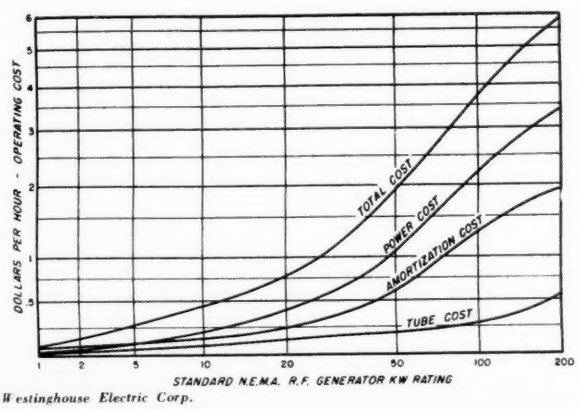
Number 2 problem is temperature control. By this process thick sections of rubber are heated much more rapidly than by means to which the ordinary rubber technician is accustomed. To avoid overheating it is necessary to maintain a close-check on internal temperature. To date no really satisfactory means has been found to accomplish this under high pressure and with the generator unit in operation.

However both these items are receiving the attention of capable engineers and rubber technologists, and the progress at this point is highly satisfactory.

As this process is more generally adopted through the rubber industry, it will undoubtedly be found advisable to modify many compounds. There is much work to be done to determine the effect of loadings of different types of fillers and pigments. This work is being carried on in a number of laboratories. The next work scheduled in V. L. Smithers Laboratories is a study of the effect of different types of carbon black at varying loadings and the influence of dispersion on the even distribution of electronic heating. The accumulation of data on these items is progressing at a rapid pace.

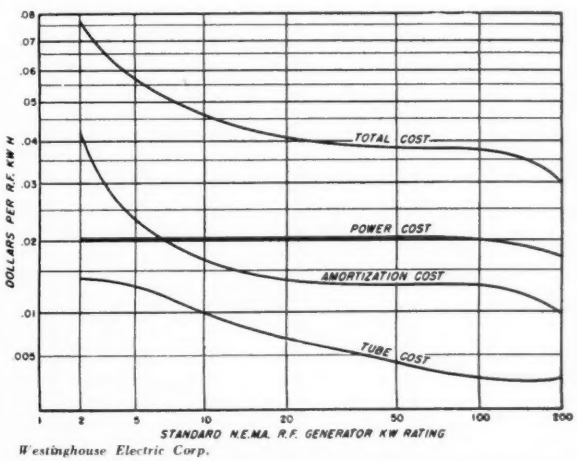
A general application of electronics to heating and vulcanizing of rubber and similar resins will undoubtedly depend on just one thing: sales capturing possibilties. Greater

(Continued on page 566)



Westinghouse Electric Corp.

Fig. 8. Per Hour Operating Costs of Standard-Size High-Frequency Dielectric Heating Units



Westinghouse Electric Corp.

Fig. 9. Dollar Cost per Radio Frequency Kilowatt Hour According to Generator Size Used

Recent Russian Literature on Natural and Synthetic Rubber—XIX

M. Hoseh

RECLAIMING SK Rubber by Thermo-Swelling Method. E. M. Tsvetaeva, *Kauchuk i Rezina*, 4/5, 67-70 (1940). S-50.

Extensive work carried out in 1939 on reclaiming of 100% SK rubber showed conclusively the adaptability of the thermo-swelling process for reclaiming this kind of rubber to the equipment available in operating plants. In this process the nature of the swelling agents is of paramount importance. Best results were obtained with plasticizers having a high degree of unsaturation. Saturated plasticizers, such as vaseline oil and plasticizers having a small iodine number, such as mazut or goudron (tar), are not effective. The most effective swelling agent was found to be polymers D (the nature of these polymers is not indicated). The use of these substances yields a high-grade reclaim which in certain instances is superior to the original rubber. Such is the case when reclaiming low-grade rubber, as overshoes. Thus reclaiming a material characterized by: plasticity 0.23, breaking strength 70 kg. per cm.^{2} (994 lbs. per sq. in.), and relative elongation 260%, yielded a product having: plasticity 0.47, breaking strength 71-98 kg. per cm^2 (1008-1392 lbs. per sq. in.).

Other substances suitable as plasticizers in this process are: cracked tars, certain pyropolymers and pyrotars. Pine tar can be used with certain precautions. Frequently, combining several plasticizers yields better results than when the same plasticizers are employed independently. The process runs smoothly in an aqueous neutral medium with constant stirring. An alkaline medium required, when the rubber contains textiles, affects this process adversely. However by choosing the proper plasticizer this difficulty is circumvented. Elevated temperatures, e.g., 160-200° C. (320-392° F.) such as are used for reclaiming NK, are not favorable for the reclamation of SK. Generally this process requires low temperatures and rather short duration.

The mechanical properties of vulcanized reclaim are determined by the recipe and conditions of vulcanization. Adding DPG (diphenylguanidine) to the recipe gives better results than sulphur alone. A chloroform extract of a reclaim obtained by the thermo-swelling method only very seldom exceeds 20%; whereas reclaims obtained by the solution method do show much higher values. The higher values for a chloroform extract obtained by the solution method indicates that the degree of disintegration is much higher for this method than it is with thermo-swelling.

Reclaiming 100% SK Overshoe Rubber by the Acid Method. O. A. Treiman, *Kauchuk i Rezina*, 4/5, 70-74 (1945). S-51.

Of the several acid methods for reclaiming SK the following should be noted: (1) plastification; (2) dispersion; (3) thermo-swelling. The first consists of plastifying rubber previously freed of textile on rolls while gradually adding suitable plasticizers. Industrial experience permits drawing the following conclusions concerning this method. Soft textile-free 100% SK rubbers are amenable to reclamation by mechanical plastification with simultaneous addition of considerable quantities of plasticizers. Reclaims obtained by this method have good mechanical properties and differ but little from the original material. The process, however, does involve considerable handling and expenditure of labor. It requires a thorough preliminary grinding of the rubber, a lengthy treatment on the rolls, and prolonged refining. For reclaiming colored rubber free of textile and consequently requiring no preliminary sulphuric acid treatment, this method is desirable.

Experience showed that preliminary dispersing of the rubber prior to its reclamation called for by the dispersion method has no advantage over the direct method of reclamation. The reclaim obtained directly by by-passing preliminary dispersion does not differ from the reclaim which includes preliminary dispersion.

The third of these methods, thermo-swelling, consists of swelling the comminuted rubber in a considerable volume of a suitable swelling agent while the mixture is heated. This method proved most satisfactory and at present is the most widespread. Because of its extensive use it became necessary to determine the effects of: the quality and quantity of the swelling agents, the nature of the regenerated rubber, the degree of preliminary comminution, duration and temperature of swelling, the medium in which the swelling takes place, the role of the swelling stage in the entire process, and mechanical treatment of swelled rubber. The opinion maintained hitherto that the swelling should be carried out at relatively low temperatures proved unfounded. Reclaims obtained under conditions of brief warming under small pressures have a good tensile strength, but a very low plasticity and small relative elongation. Futhermore such reclaims are handled with difficulty on rolls and require five or six refinings. A reclaim obtained by swelling at medium pressure had good characteristics after the third pass through the refiner. At the proper temperature the swelling time can be reduced from the originally proposed 24 hours to 8-10 hours. The preliminary grinding of the rubber to be refined is of decided importance. For best results a thorough mechanical grinding of the material is necessary. The plasticizer is best incorporated prior to heating the rubber in the cooker. At the time when the rubber is rolled, the rolls should be cooled and the gap between them closely regulated. The nature of the reclaim and the quantity of waste in its production depend on the uniformity of the material being regenerated. When the original material is well classified and thoroughly ground, the tailings do not exceed 8%, based on the reclaim. When the original material is mixed, consisting of rubber of various composition and degrees of vulcanization, the waste may increase to 15-20%.

Production of Molded Overshoes in 1940. A. D. Korobov, *Kauchuk i Rezina*, 4/5, 82-97 (1940). SN-76.

In 1940 the shape of galoshes underwent a complete change in order to adapt them to the new style of shoes. Along with it the production of molded overshoes was greatly improved. The two-stage molding process for overshoes comprises placing the rubber cutout and the core into a mold and preliminarily pressing the rubber for 1.7-1.9 minutes without heat application. The molded product is taken out from the mold together with the core. It is inspected; any apparent flaws are corrected, and the premolded overshoe on the core is inserted into a heated mold where it is finally pressed and vulcanized. The advantages of this method include: a substantial reduction of the second- and third-grade products as well as of rejects; a reduction in the consumption of rubber per pair of overshoes (70 gms. per pair), extension of the life of the mold, production of goods of true dimensions, and reduction of the wall thickness of vulcanizing molds. As compared to the manual method of production, molding effects a considerable saving of labor, energy consumption, and use of raw material. The process is discussed in detail.

(To be continued)

Methods of Applying Certain Antioxidants to Guayule Crude Rubber for Preservation during Storage

Howard Tint[1] and James M. Cumming[1]

RAW and vulcanized guayule rubbers show greater deterioration in storage than corresponding *Hevea* products. Upon exposure to air and light, ordinary crude resiniferous guayule rubber deteriorates rapidly, becoming exceedingly soft and tacky. Since this characteristic feature of guayule rubber has made storage and subsequent handling of the crude difficult, it was desirable to investigate quality maintenance during storage, using some new methods of applying certain known preservatives.

In *Hevea* rubber are small quantities of antioxidant substances which afford a high degree of protection against natural oxidation,[2] but guayule crude, as obtained by conventional extraction procedure,[3] shows no evidence of being similarly protected. Furthermore, since the extraction process involves drying at elevated temperatures (200° F.), which subjects the rubber to accelerated aging, it is advisable to add a commercial antioxidant to the guayule rubber pellets prior to drying, thus inhibiting oxidation during drying and storage.

The aromatic amines have been used as preservatives for guayule;[4] Tonox (p-p'-diamino-diphenyl-methane) has been utilized successfully by the Emergency Rubber Project. However owing to its extremely low solubility in water, Tonox has been applied to wet rubber with organic solvents, thus increasing costs of application and presenting fire hazards. Its action upon guayule crude has been a stiffening one, which under normal conditions is very desirable in the product; however, in those cases where guayule is used to improve the workability and tackiness of a compound, the stiffening and reduction of tack brought about by Tonox may work to some disadvantage.

Hence the objectives of this study have been to investigate the effects of some antioxidants on the aging of guayule crude from two points of view: (1) to obtain a firm rubber with low tack and good storage qualities, as has heretofore been possible through the use of Tonox, but on a more economical and practical basis; and (2) to obtain a soft rubber, without imparted stiffness, having satisfactory storage properties.

Preliminary tests indicated that, in general, primary aromatic amines appeared more effective than other preservatives in activating the cure and imparting stiffness and low tack during the storage of the crude. Secondary amines, on the other hand, seemed not to activate the cure or stiffen the crude. Therefore some of the more effective primary and secondary amines were compared as to their effects upon the storage characteristics of the product, considering primarily the most economical methods of application.

The antioxidants tested in this investigation are tabulated in Table 1.

[1] Employed in pilot plant of Guayule Rubber Extraction Research Unit, Bureau of Agricultural and Industrial Chemistry, Salinas, Calif. Guayule Emergency Rubber Project of the United States Department of Agriculture.

[2] H. A. Bruson, L. B. Sebrell, and W. W. Vogt, "Isolation of the Natural Oxidation Inhibitors of Crude **Hevea** Rubber," **Ind. Eng. Chem.**, 19, 1187-91 (1927).

[3] Report by members of the staff of the Eastern Regional Research Laboratory of the Bureau of Agricultural and Industrial Chemistry, United States Department of Agriculture, at Wyndmoor, Pa. "Recovery of Rubber from Young Guayule Shrub," **India Rubber World**, 109, 475 (1944).

[4] D. Spence, U. S. patents Nos. 1,753,184 and 1,753,185 (1930).

[5] Surface moisture was removed by dewatering in toggle press. Under these conditions (final moisture 45%, wet basis) a subsequent antioxidant spray was uniformly retained.

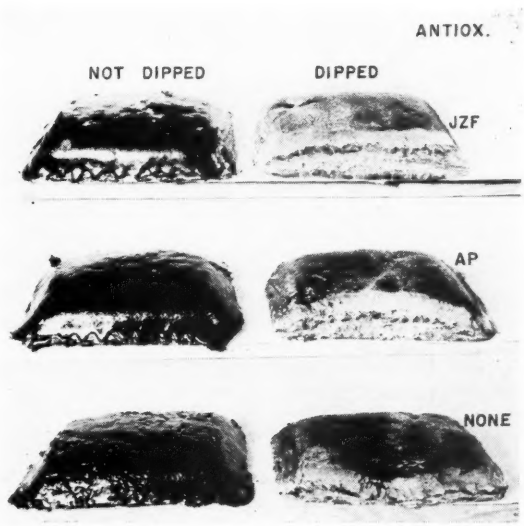


Fig. 1. Rubber Blocks after Aging for 22 Days in Circulating-Air Oven (70° C.): (Top row) Treated with JZF; (Center row) AgeRite Powder; (Bottom row) Control without Internal Antioxidant; Right-Hand Samples Dipped into Tonox Solution; Left-Hand Samples Not Dipped—(Note the Blackened Areas Indicating Tackiness and Absorption of Talc).

TABLE 1. ANTIOXIDANTS USED IN THE INVESTIGATION

Symbol	Chemical Name	Trade Name
T	p-p'-diamino-diphenyl-methane	Tonox
BB	4-4'-diamino-diphenyl	Benzidine base
MDT	2-4-diamino-toluene	M.D.T.
JZF	p-p'-diphenyl-phenylene diamine	J.Z.F.
AP	phenyl beta-napthyl amine	AgeRite Powder

The guayule rubber was of the ordinary resiniferous type obtained in the pilot plant of the Bureau of Agricultural and Industrial Chemistry at Salinas, Calif., by the conventional mechanical extraction method. Analyses of three batches of rubber used in the various tests are shown in Table 2.

TABLE 2. RUBBER SAMPLES USED IN THE INVESTIGATION

Batch No.	Resin*	Rubber Hydrocarbon†	Acetone and Benzene Insolubles
I	16.3%	72.0	11.7
II	18.7	69.1	12.2
III	21.7	68.5	9.8

* Calculation by difference 100% - % (R/HC+A&B Insol.) = % Resin.
† Determined by Edison's bromination method.

Firm-Rubber Tests

The antioxidants tested in this part of the investigation were Tonox, benzidine base and M.D.T., each applied to the wet rubber at a concentration of 0.5% (dry rubber basis). Treatments were in triplicate, and all samples were dried at 200° F. in a through-circulation drier to 1% moisture or less. Controls were dried without antioxidants.

Each preservative was applied to aliquots[5] of batch No. 1 by the following methods:

1. Acetone solution (5%, solution basis), sprayed on both sides of bed of rubber on tray.

2. A 5% aqueous solution of M.D.T. and 5% aqueous colloidal suspensions of Tonox and benzidine base sprayed on both sides of rubber beds in trays.

3. Antioxidant dispersed or dissolved in water to be used for a soaking treatment of the rubber. The bath was at a water-to-rubber ratio of approximately 100-to-1 and contained 0.5% of antioxidant (dry-rubber basis). Soaking

TABLE 3. RESULTS OF ACCELERATED AGING TESTS OF GUAYULE CRUDE TREATED WITH VARIOUS PRIMARY AROMATIC AMINES. (EACH TREATMENT WAS IN TRIPLICATE)

Antioxidant	Method* of Application	Relative Tackiness after Aging†		Physical Tests on Rubber after Sunlight Aging					
		Aging in Direct Sunlight	Aging 24 Hours in Oven at 70° C.	Plasticity Number‡	Recovery No.‡	Opt. Cure Min.	Tensile at Break P.S.I.	Mod. 500% Elong. P.S.I.	Ult. Elong. %
T	S.C.D.	0	2	60	60	45	3180	1150	660
	S.A.S.	0	2	80	80	45	3000	1700	620
	Bath	1	2	60	60	45	3220	1230	680
BB	S.C.D.	1	2	70	70	45	3020	1280	660
	S.A.S.	1	2	90	90	45	2950	1390	620
	Bath	2	3	50	50	45	2860	780	700
MDT	S.W.S.	1	2	70	70	45	1590	1210	540
	S.A.S.	1	2	70	70	75	2660	1320	620
Control	No antioxidant	4	5	30	30	75	2180	650	680

*S.C.D.—Sprayed on the rubber pellets as a colloidal dispersion.
S.A.S.—Sprayed on the rubber pellets as an acetone solution.
Bath—Antioxidant dispersed or dissolved in aqueous bath for soaking rubber.
S.W.S.—Sprayed as water solution.

†Increasing numbers denote greater relative tack.
‡Used Williams plastometer; upper platen 5 kg.; 2-cc. rubber pellet; oven temperature at 100° C.
Plasticity number—thickness of pellet in thousandths of an inch after three-minute compression.
Recovery number—thickness after 15-minute recovery at room temperature.

period was of 30 minutes duration at 50° C., during which all baths were uniformly agitated.[6]

Colloidal dispersions of water-insoluble antioxidants were prepared in the presence of 3% casein (solution basis) by passing the suspensions five times through a colloid mill. Though these dispersions were only 10% colloidal, they could be uniformly sprayed and were completely dispersed by mild agitation.

The preservative effects of the above antioxidants upon the crude rubber were tested by comparing the degradation of the treated samples under accelerated aging conditions. After drying, portions of the rubber samples were blended on a mixing roll and sheeted to ⅛-inch thickness. The slabs were then aged in direct sunlight or in a circulating-air oven at 70° C. After exposure they were compared for relative tackiness. Samples from each exposure treatment were held for approximately two months at room temperature and in diffuse light; after which they were tested for physical characteristics.[7] Results of some of these tests are summarized in Table 3. Since the conditions chosen for the soaking treatment did not permit an adequate comparison between a water soluble and insoluble antioxidant, results of tests of rubber soaked in a water solution of M.D.T. are omitted.

With both aging treatments, the antioxidant-treated samples were significantly less tacky than the corresponding controls. Application of antioxidants in a spray was more effective than the water-bath treatment. By visual comparison, little difference in effect was apparent among the various antioxidants.

The physical tests reported in Table 3 confirmed previous observations that treatment with the antioxidants yielded products stiffer than the controls, as shown by relatively higher plasticity numbers and moduli measurements. Again, spray application appeared somewhat more effective than water-bath treatment for imparting stiffness. According to the physical testing criteria applied, Tonox and benzidine base were equally superior to MDT for imparting higher tensile strength to the rubber, and spraying with an acetone solution apparently imparted a somewhat greater degree of hardness than soaking in an aqueous bath.

Since all the samples from the oven-aged series were not tested, the series has not been reported; however physical measurements, where obtained, were in good agreement with those reported above with one exception—water-spray treatment with MDT. For the oven-aged sample a tensile of 3600 p.s.i. was obtained in contrast with 1590 p.s.i. reported for the sunlight-aged sample. From other physical test data for the latter sample it would appear that the smaller figure is abnormally low.

Other portions of rubber subjected to the various antioxidant treatments described above were compounded[8] and tested without aging in the crude. See results reported in Table 4. Tests were made of green samples and of oxygen-bomb-aged samples.

Statistical analyses of the data for the green samples indicated that variance for the several antioxidants was significant, and that the antioxidants were not consistent in their effects for corresponding methods of application. There was no significant variance resulting from replication. Considering spray methods of application, MDT gave significantly higher tensiles than did Tonox or benzidine base, or the controls, and the latter three were not significantly different. Considering Tonox and benzidine base, there was no advantage in any method of application; whereas, for the water-soluble MDT, results from the water bath application again indicated the inadequacy of the particular soaking procedure employed, not of this method of applying MDT. These data therefore are omitted from the comparison.

Analyses of the oxygen-bomb data indicated that the tensiles resulting from treatment with the various antioxidants were not significantly different among themselves and not better than the control. However, considering that the values for ultimate elongation of the samples treated with Tonox and benzidine base were generally lower than those for MDT-treated samples and controls, it appeared that the former samples were stiffer than the latter. This point suggests that the stiffening effect of Tonox or benzidine base is carried through into the vulcanizate.

These test conditions do not exhaust the possibilities of application methods or concentrations that may be employed for adequate comparisons among these preservatives; however, since the immediate objective of the work was achieved: namely, a satisfactory alternative for the method of applying Tonox from solutions in organic solvents, further work on this aspect of the problem was deferred. Since the effectiveness of Tonox has been established in practice, for the development of the remaining portions of this investigation application of this antioxidant in the form of aqueous colloidal dispersions was employed.

Soft Rubber Tests

To preserve guayule crude without imparting stiffness, it was suggested by G. W. Miller[9] that a possible solution

[6] These soaking conditions were selected to conform with those readily obtainable by adding the antioxidant to a conventional step in the extraction process. It is recognized that the use of other antioxidant concentrations would have altered results, especially in the case of the water-soluble MDT.

[7] Compounded on 2- by 6-inch mill at 120° F. Formula: rubber, 100.0, Captax, 1.0; stearic acid, 4.0; zinc oxide, 6.0; sulphur, 3.5. Tensile sheets (0.025-inch) molded from the stocks at 45- and 75-minute cures at 260° F.; Type C dumbbells.

[8] Formula: rubber, 100.0; Captax, 0.5; stearic acid, 4.0; zinc oxide, 6.0; sulphur, 3.5. Milled on 6 by 13-inch rolls at 120° F. A.S.T.M. tensile sheets (0.075-inch) molded from stocks at 30-, 60-, and 90-minute cures at 260° F.; Type C dumbbells.

[9] Chief, Rubber Extraction and Development Branch, Emergency Rubber Project, Forest Service.

TABLE 4. TESTS OF RUBBER SAMPLES TREATED WITH VARIOUS PRIMARY AMINES. VALUES ARE AVERAGES OF THREE RUNS AT OPTIMUM CURES

Anti-oxidant	Application*	Tensile at Break P.S.I.		Modulus 500% Elong. P.S.I.		% Ultimate Elong.		Shore Hardness	
		Green	Aged†	Green	Aged†	Green	Aged†	Green	Aged†
T	S.C.D.	2550	2040	980	900	650	640	43	42
	S.A.S.	2560	2230	1000	1050	650	630	43	43
	Bath	2650	2040	910	840	670	670	42	42
BB	S.C.D.	2550	2130	1070	970	650	640	43	42
	S.A.S.	2580	2300	1170	1100	620	650	43	44
	Bath	2530	1960	840	680	660	690	39	42
MDT	S.W.S.	3240	2300	970	800	690	690	42	44
	S.A.S.	3250	2210	980	820	710	690	42	45
Control	No antioxidant	2410	2110	620	550	730	750	38	41

*S.C.D.—Sprayed on the rubber pellets as a colloidal dispersion. S.W.S.—Sprayed as water solution.
S.A.S.—Sprayed on the rubber pellets as an acetone solution. †In oxygen bomb, 24 hours, 70° C., 300 p.s.i.
Bath—Antioxidant dispersed or dissolved in aqueous bath for soaking rubber.

TABLE 5. EFFECTS* OF AGING UPON PRESSED RUBBER BLOCKS, WHICH RECEIVED VARIOUS COMBINED ANTIOXIDANT TREATMENTS

Quality	Surface Treatment	Antioxidant (Internal)	Oven Aging at 70° C. Days in Oven									Shelf Aging at Room Temperature Days on Shelf
			1	2	3	5	9	15	22	60	100	160
Tack†	Blocks dipped into Tonox solution	Control	0	0	0	0	1	2	6	8	8	0
		JZF	0	0	0	0	0	1	4	6	6	0
		AP	0	0	0	0	1	2	4	7	8	0
	None	Control	2	3	5	6	8	10	10	10	10	10
		JZF	1	2	3	4	6	10	10	10	10	10
		AP	2	2	4	5	7	10	10	10	10	10
Flow	Blocks dipped into Tonox solution	Control	0	0	1	3	3	6	8	10	10	0
		JZF	0	0	0	1	1	5	4	6	6	0
		AP	0	0	1	3	3	5	8	9	9	0
	None	Control	0	0	2	5	6	6	9	10	10	0
		JZF	0	0	2	3	4	5	9	10	10	0
		AP	0	0	2	4	5	6	9	10	10	0

*Increasing numbers represent increasing relative deterioration, as judged by visual observation, 0 being tack free and without flow and 10 representing the most advanced tack or flow in the experiments.
†Measured in terms of relative stickiness to touch and of absorption of talc, 0 being white and tack-free, and 10 showing talc completely absorbed and a surface having the consistency of rubber cement.

might lie in the use of a secondary amine to protect the rubber during drying, followed by surface treatment of the finished rubber block with Tonox or other primary amines. Thus surface-stiffening only or "case hardening" might prevent the development of surface tack and reduce flow in storage. This treatment would require a relatively small amount of primary amine and therefore should not affect subsequent operations requiring soft and pliant rubber.

Wet rubber of Batch II was sprayed with either an acetone solution of JZF (0.5%, dry rubber basis) or of AgeRite Powder (0.5%), and then dried in the atmospheric tray drier. An untreated control was included for comparison. Sixteen pounds of dried rubber from each treatment was divided into four equal parts, each of which was molded in a blocking press (pressure, 150 p.s.i.). Two blocks representing each treatment were dipped for one minute into a 10% acetone solution of Tonox, dried in air, and dusted with talc. The remaining blocks were dusted with talc without further antioxidant treatment. Half of the blocks, including a single representative of each combination of treatments, were placed in shelf storage in diffuse light at room temperature. The remaining blocks were placed into a circulating-air oven at 70° C. Observations were made periodically on the appearances of the blocks under these conditions (Figure 1), and samples were withdrawn for compounding and physical tests[10] after 15, 60, and 100 days. The blocks in shelf storage were also regularly examined and were tested after 160 days. The results of the visual observations on the blocks under the accelerated aging conditions have been summarized in Table 5, and the results of the physical tests on all rubber samples are in Table 6.

Under the conditions of shelf storage, none of the blocks exhibited flow or distortion, and only the undipped blocks showed surface tack and absorption of talc, beginning three to five weeks after the initiation of storage. Similarly, there were few differences in physical test data on the normally stored samples.

Under accelerated-storage conditions the development of surface tack and flow occurred much earlier in blocks which had received no surface treatment, and, considering paired samples, a superiority of the JZF treatment to that of AgeRite Powder was evident. The latter outranked the control only slightly. Physical test data in general showed no consistent variation in quality relative to the particular antioxidant combinations. Hence variations in storage characteristics were apparently achieved without imparting changes in the basic physical characteristics of the rubber.

To test the effects of variations in surface applications of Tonox, identical blocks (six by six by five inches) of rubber from Batch III, which had been treated with 0.25% JZF before drying, were given various surface treatments. A block was immersed for two minutes in 10% Tonox in acetone or 10% Tonox in aqueous dispersion or 2% Tonox in acetone or 2% Tonox in aqueous dispersion or was painted with an aqueous dispersion of Tonox and talc (to yield either 0.03- or 0.007-gram of Tonox per square inch of surface). Talc was added to the dipped blocks in sufficient quantity to give them the same surface appearance as shown by the painted blocks. Periodic observations on the physical aspects of the blocks during 45 days of storage under accelerated-aging conditions (circulating-air oven at 70° C.) are summarized in Table 7. Immersion in a Tonox bath of 2% concentration, in the form of either acetone solution or aqueous dispersion, was insufficient to prevent early surface tack and flow development. Ten per cent. Tonox, in aqueous dispersion, did not prevent tack, but inhibited flow somewhat. Immersion in 10% solution of Tonox in acetone yielded the best preserved block in the dipped series. Surface painting with Tonox in the higher concentration re-

[10] Formula: rubber, 100.0; Captax, 1.0; stearic acid, 4.0; zinc oxide, 6.0; sulphur, 3.5. Milled on 6 by 13-inch rolls at 120° F. A.S.T.M. tensile sheets (0.075-inch) molded from stocks at 30-, 60-, and 90-minute cures at 260° F.; Type C dumbbells.

TABLE 6. EFFECTS OF NATURAL AND ACCELERATED AGING UPON PRESSED RUBBER BLOCKS WHICH RECEIVED VARIOUS COMBINED ANTIOXIDANT TREATMENTS. TEST DATA AT OPTIMUM CURES

Anti-oxidant	Surface Treat-ment	Type of Storage	Days Stored	Tensile at Break P.S.I.	Mod. 500% Elong. P.S.I.	% Ultimate Elong.	Shore Hard-ness	Plas-ticity Number	Re-covery Number
		None	0	2610	840	690	42	..	..
	None	Oven	15	2640	990	680	46	..	..
			60	2900	1120	680	45	..	..
			100	2440	1060	660	41	64	68
JZF		Shelf	160	2980	540	790	40	99	105
	Blocks dipped into Tonox sol.	Oven	15	3010	740	780	38	..	..
			60	3030	1070	700	45	..	..
			100	2800	1120	670	41	76	82
		Shelf	160	3120	750	750	40	110	120
		None	0	2570	750	710	42	..	..
	None	Oven	15	2550	750	710	44	..	..
			60	2540	850	670	41	..	..
			100	2380	860	680	41	61	69
AP		Shelf	160	3080	730	750	40	95	100
	Blocks dipped into Tonox sol.	Oven	15	2670	650	750	40	..	..
			60	2640	860	700	44	..	..
			100	2470	950	650	41	59	65
		Shelf	160	2820	580	770	36	102	112
		None	0	2500	710	710	39	..	..
	None	Oven	15	2530	810	700	41	..	..
			60	2280	800	690	41	..	..
			100	2280	1010	640	40	51	56
Control (No antiox-idant)		Shelf	160	2560	390	820	31	90	96
	Blocks dipped into Tonox sol.	Oven	15	2500	840	690	41	..	..
			60	2840	1030	670	44	..	..
			100	2320	930	680	40	55	58
		Shelf	160	2990	630	770	40	84	89

TABLE 7. RELATION OF DIFFERENT CONCENTRATIONS AND METHODS OF APPLYING SURFACE TREATMENTS OF TONOX TO THE ACCELERATED AGING OF BLOCKED GUAYULE CRUDE

Surface Treatment		Quality* After Days in Oven 1	3	5	15	45	Physical Tests† After 45 Days: Plas-ticity Number	Recov-ery No.	Tensile at Break P.S.I.	Mod. 500% Elong. P.S.I.	% Ultimate Elong.	Shore Hard-ness
10% Tonox in acetone solution	Tack	1	2	2	2	4	79	82	2390	620	710	39
	Flow	1	2	3	3	4†						
2% Tonox in acetone solution	Tack	1	3	4	4†	5	81	94	2290	350	790	31
	Flow	1	2	3	5	5						
10% Tonox as aqueous dispersion	Tack	1	2	3	4†	5	81	92	2620	700	720	36
	Flow	1	2	3	5	5						
2% Tonox as aqueous dispersion	Tack	1	3	4	5	5	78	88	2450	590	710	36
	Flow	1	2	3	5	5						
0.03 gm. Tonox/sq.in. of surface from aqueous dispersion containing talc	Tack‡	0	0†	1	2	2	81	93	2350	600	706	36
	Flow	1	2	3	3	4						
0.007 gm. Tonox/sq. in. of surface from aqueous dispersion containing talc	Tack¶	0	1	1†	2†	3	100	113	2400	630	700	40
	Flow	1	2	3	4	4†						

*As indicated by tack and flow. Increasing numbers denote greater relative deterioration.
†Values at optimum cures.
‡Tack developed only in narrow fissures on surface, which after 45 days varied from 1/8- to 1/4-inch in width.
¶Tack only in fissures, more numerous and wider than above.

duced distortion and permitted tack development only in small surface fissures resulting from internal flow. The paint of lower concentration was less effective in this respect.

Physical testing of the products of this series (Table 7) revealed no significant differences among the various treatments. This was consistent with the results in Table 6 which showed that this method of applying a combination of antioxidants in preparation for storage results in little alteration of the physical-test qualities of the treated rubber.

In another series of block-storage tests a comparison was made of the effects upon crude rubber, of several concentrations of JZF, applied to wet rubber as sprays of aqueous dispersions and acetone solutions, followed by surface-treatment of the block with Tonox. The results of these tests, not included in this report, demonstrated that both methods of applying the internal antioxidant were equally effective. Within the range of JZF concentrations employed in these experiments (0.1-0.5% antioxidant, dry-rubber basis), there were no significant differences in storage quality or physical characteristics of the treated samples.

(Continued on page 520)

Advances in Rubber During 1945[1]

E. G. Chilton[2]

THE end of the war has seen the rubber industry come through with flying colors (1, 2).[3] Although hit harder than most other industries by shortages in its main raw materials, it has solved the problem by the creation of the synthetic rubber plants whose gigantic production capacity becomes evident only now when compared to the enemies' efforts that extended over a much longer period of time. We can look with pride on a production record of 737,000 tons of GR-S in the year 1944; while the German figure never reached more than 120,000 tons in any similar period (3).

Developments in Rubbers

GR-S was still the mainstay of the synthetic program, and much effort was spent to improve its properties and processing qualities (4-8). Although much can be gained by proper handling, the question is still one of compromise between ease of processing and good physical properties of the vulcanizate. One of the most promising of the synthetics is Butyl (GR-I), which has found increasing use in the industry (9-10). As Butyl is an ideal material for inner tubes because of its low permeability to gases, almost the entire wartime production was taken up for this and other purposes by the Armed Forces (11). Its high hysteresis and great resistance to some oils also make it a useful synthetic for many types of mechanical goods. Few new developments were noted for the other special-purpose synthetics, such as neoprene, Buna N, and "Thiokol," but comparisons of their production and properties with those of GR-S, Butyl, and natural rubber appeared in the literature (12-13).

Several investigators reported new synthetic rubbers, but most of these inventions are still in the laboratory stage (14-16). Some of the most talked-about new products are those made from silicone resins. Unaffected by temperatures as high as 450° F. and as low as −70° F., they have already proved very effective as gasket materials in airplane engines, as bases for heat and cold-resistant oils, and in other products (17-20).

As the borderline between synthetic rubber and plastics becomes ever narrower, many of the manufacturers are making use of their laboratories and processing equipment to manufacture plastic products (21-22). In fact, an all-plastic tire has been produced, and, although no complete reports are available, it is supposed to show some promise (23).

The saying goes that "necessity is the mother of invention", and that applies to nothing better than the tremendous advances made in the reclaiming processes (24-26). Neglected for many years while crude rubber was plentiful, the reclaiming industry has proved a vital contribution to the war effort. Much work has been done to improve the process (27), and reclaim from synthetic stocks has even proved valuable as an extender for raw rubber (28-29). The main difficulties encountered are those of sorting the scrap as to the different types of rubber and synthetic, for each type requires a different reclaiming method.

In spite of the advances in synthetics, a certain percentage of crude rubber is still needed for tire production and the manufacture of some other products. Some of this requirement was filled by the stock-pile available, some through shipments from Ceylon, South America (30), and Africa, and some from the continued attempt to extract rubber from plants other than the *Hevea brasiliensis*, the original rubber tree. While some courageous men have braved the wilds of the African and Central American jungles to tap wild rubber (31-32), the Department of Agriculture has conducted experiments with guayule, *cryptostegia grandiflora*, goldenrod, dandelion, and *Castilla* (33-36) Although many of these "home-grown" rubbers have qualities approaching those of *Hevea*, they can hardly compare with the cost of peacetime *Hevea* rubber. Despite the war, the British have continued their research facilities in Ceylon and have formulated plans for the rehabilitation of the Malayan rubber-growing areas (37-39). Even Brazil, where rubber originated, intends to recapture some of its rubber trade and has built a research organization under the guidance of the United States to study the problems involved (40-41).

Developments in Compounding Ingredients

In line with the development of synthetic rubber and plastics, the chemical industry has continued to produce processing materials, and the laboratories have kept step by evaluating their properties. Since process-hardening is one of the greatest drawbacks of GR-S, the line of plasticizers and softeners is ever growing (42-44). As their number must by now reach into the hundreds, it is worth referring to a summary paper giving the characteristics of the various groups of these chemicals (45). A similar summary was prepared by the same authors for extenders (46), of which there was also a number of new types. Vulcanizing agents (47), peptizers (48), and accelerator activators (49-50) were some of the other new chemicals offered. In the last year the importance of reenforcing carbon black has induced a great deal of research, the accent lies mainly on the size and dispersion of the black particles in the rubber (51-54) and the thermal and electric conductivity imparted to the mixture (55-56). It has been possible to produce an electrically conductive rubber in which the carbon is dispersed to form a continuous chain, and this is being used for non-static conveyer belts (57), for airplane propeller deicers (58), and for tires, tracks, and bogie wheels on radio-equipped vehicles. There have also appeared several reinforcing agents other than black, particularly for vari-colored products (59-60).

Processing and Testing Improvements

Presented with a profusion of available compounding ingredients, the compounder must rely on physical tests to determine the best combination to arrive at the properties required by the finished product (61). The standard tests of the A.S.T.M. (62) can well be relied upon if performed properly according to Porritt and Scott (63), but some investigators propose additional tests to determine special characteristics. A compression-tear test is suggested that is claimed to duplicate road-cracking of tread stocks (64), while a new shape of tear-test specimen is supposed to give more accurate results than the crescent shape now in general use (65). While hardness testing is still one of the quickest and easiest methods of comparing stocks, it has well-known deficiencies. In trying to eliminate some of these deficiencies, the British have designed a new penetration hardness meter and have standardized the technique to be used with it (66). Since different hardness meters are used in many countries, a nomographical comparison of the most common types should also prove of interest (67). Many of the studies of the physical testing laboratories have been concerned with processing properties of various compounds (68), and much work has been done in the field of rheology (69). Instead of a single measurement of plasticity, one author arrived at a series of seven related tests that are said to determine the rheological properties of the stocks with great accuracy

[1] Presented before Rubber and Plastics Division, A.S.M.E., Hotel Pennsylvania, New York, N. Y., Nov. 27, 1945.
[2] Firestone Tire & Rubber Co., Akron, O.
[3] Bibliography references appear at end of article.

(70). The effects of nip width of milling machine rolls and of the roll temperatures were the subjects of two papers which show that, while the former has but little influence, the latter can seriously alter the properties of the stock (71-72). The need of adequate cooling of rubber machinery is further accentuated in another article (73) and by the development of new agents to remove scorched materials from mill rolls (74). Research into this effect of mastication has shown that atomic oxygen from peroxides is freed at high temperatures and during prolonged milling operations and is the cause of most of this deterioration (75-76). Requirements for extruding processes are also to be found (77).

Several new facilities for the rubber factory have shown up in 1945, such as a fast and continuous method for cementing and drying tire fabrics without subjecting workers to the toxic fumes of the solutions (78). As in so many other fields, new electrical controls have appeared for maintaining constant speeds and temperatures on calenders and controlling tuber output (79). Perhaps the most publicized of the electrical inventions is electronic curing (80). Already a mold press has appeared on the market which has facilities for electronic preheating of the rubber in the mold, thus securing a more even heat distribution throughout the rubber mass and reducing overall curing time (81). New methods of molding (82) made their appearance, among them an injection molding machine for rapid manufacture of small products (83). Since the mold is never cooled, the inventors claim much shorter curing time and improved homogeneity of the product due to thorough mixing of the rubber in the injection nozzle. A mold cleaner and a non-staining mold lubricant are given as further aids to the mold shop (84-85). The molding of rubber to metal has received further consideration in studies on the theory of brass plating and the chemical action that occurs between the brass and the rubber to form desired adhesive properties (86-87). Synthetic rubber presents special problems in its adhesion to metal and other materials, which becomes evident by the many new synthetic adhesives on the market and the development of new test methods for them (88-91).

Wartime Developments in Tires and Other Products

As regards tires, owing to more and more exacting demands of the Armed Forces, it has become necessary to evaluate the tolerances to which tire production can be held and to assess their importance (92). For the same reason, elaborate tests both on dynamometers and on actual test courses were necessary to prove tire values (93-95). Some of the test fleets operated under the most grueling desert conditions day in and day out and bore witness to the excellence of American tire production. Much of the credit for this excellence must go to the makers of tire cord, who not only have developed improved cotton fibres (96-97), but who also have presented the tire manufacturer with nylon and rayon cords of a wide choice of properties (98-101). All these fibres have been subjected to prolonged study to determine their characteristics under various loads, temperatures, and amounts of moisture (102-103).

Even though tires and tubes formed the greatest bulk of rubber production during the war, the industry turned out many remarkable and important war products that aided materially in the course of victory. Many of these have become known only now that the war is over. Early in 1940 the Germans attempted to isolate the British Isles by a combination of U-boat warfare and the magnetic mine. Ships could be protected from the latter by an expensive and cumbersome degaussing belt. This, however, did not destroy the mines which remained as a potential danger, until the British built a buoyant cable coil in which sufficient magnetic forces could be created to explode safely the mines (104). Buoyancy was achieved in various ways, one of which was by making the cable center of tennis balls supported in a molded rubber form. As the tides of war turned in favor of the Allies, many a successful invasion was aided by collapsible rubber maps of the terrain to be invaded (105). These maps took but little space when folded and when opened presented a vivid three-dimensional view of the topography. In order to supply the advancing troops with spare rubber parts far from home, the Navy even built a complete small rubber shop on one of the Pacific Islands capable of turning out molded goods to the amount of 6,000 pounds of rubber a day (106). With similar intentions, the Army operated a tire repair shop in Italy that reconditioned as many as 500 tires a day (107). In the rapid wartime development of airplanes, the rubber industry has had a great share, much of which—like tires, fuel cells, and engine mountings—is too well known to be discussed here (108). Some of the latest aids are for propellers and helicopter rotors to aid in cooling the engine, increase the propeller efficiency (109), and protect the blades from wear (110). One article mentioned a method of spraying a thin layer of nylon between rubber layers of a fuel cell to prevent fuel evaporation through the walls (111). Other aircraft companies have experimented with various rubber and plastic adhesives for metal-to-metal or metal-to-wood bonding and are said to have produced remarkable bond strength (112-113). Claimed to have saved 10,000 lives on D-Day in Normandy and one of the best kept secrets of the war, a floating tank known as the D-D Device was built by Firestone according to a British invention (114). A rubberized canvas wall reenforced by steel framework extends around the sides of a Sherman tank and is elevated to a height of some 15 feet by means of pneumatic rubber tubes and other mechanical devices. Because of the displacement of this fabric hull, the tank is buoyant and can be floated to the objectives. When it reaches them, the tubes can be instantly deflated, the wall collapses, and the tank is ready for action. Some 350 of these were delivered to the Army prior to D-Day and only the quick result of the atomic bomb obviated the necessity of their use against Japan.

Since the end of the fighting, new products for civilian uses have reached all the way from pneumatic surgical tourniquets to foamed rubber powder puffs (115-116). Yet the industry has never stopped to produce new aids for factories and shops. Periodicals reported a new heat-resistant forming pad and die for sheet metal forming-presses (117). Buna N-type rubbers have proved to give excellent bonding for abrasive wheels (118); while other synthetics have been used in the manufacture of oil seals on rotating shafts (119). A conveyer belt constructed of neoprene and fiber glass is said to outwear any other type of belt and to have negligible elongation (120). For electrical recording of stresses in steel frames, strain gages can now be molded into a rubber button that will protect them from inclement weather conditions for out-of-door use (121).

Research Developments

The increasing need of scientific investigation has nowhere been realized more fully than in the rubber industry. Since Goodyear finished its Research Building two years ago, the Firestone Research Laboratory, was opened in 1945 (122) and a new Goodrich Laboratory is planned for the near future (123). These laboratories are or will be fitted with the most modern of tools, electronic devices, and scientific apparatus. Electron microscopes, X-ray diffraction units, infrared and mass spectrometers are the more spectacular of the instruments which have received the most attention recently (124-126). With these and many others the investigations into the physical and chemical nature of rubber and synthetics have made great strides. High-power microscopes have revealed facts of micro-chemical structures of rubber-like substances that were not to be explained by the molecular theory alone (127-129). This theory itself has been extended considerably in the light of new investigations (130-134). Studies of the formation of gels, osmotic pressure, etc., have yielded valuable information on the molecular structure of the solutes (135-139). Not only can rubber be dissolved in liquids, but gases like oxygen are soluble in rubber,

and a great deal of work has been done to determine this effect and correlate it with the oxidation and deterioration of the compound. The data seem to show that oxidation progresses only under the action of peroxides or atomic oxygen and that, therefore, the best antioxidants are those that prevent the formation of these peroxides (140-142). The phenomenon of exposure cracking can be explained in a similar way through the combination of ozone and strain: the latter is necessary to tear the deteriorated particles and present fresh surfaces to the action of the ozone (143). In the processing of rubber, however, peroxides are helpful chemicals if carefully controlled (72-76, 144-145). For similar reasons a method was also developed to determine the amount of peroxides contained in a cured vulcanizate (146). This method is part of an increasing field for research in the determination of the constituents of an unknown piece of cured stock. As already mentioned, this is of particular importance for sorting reclaim, and several tests have been suggested to identify certain base polymers (147-149), accelerators (150), vulcanizing agents (151), and even the amount of unsaturation (152) which in turn gives an indication of the resistivity to oils and oxidation.

In line with this great volume of chemical research, rubber physicists have reported a profusion of data which can be mentioned only briefly. Working in general on the cured vulcanizates, their investigations have covered such characteristics as stress-temperature relations (153-154), the phenomenon of creep and relaxation (155-157), and the mathematical theories connected with them (158-160). In order to measure Young's modulus at extremely small deflections, one author has used sound waves of 10,000 C.P.S. frequency, whose speed of propagation along a rubber fiber gave him a means to calculate that modulus (161). Other investigators have determined properties of elastomers at low temperatures, tests which are of great importance to the designers of high-altitude aircraft (162-165). Since rubber is one of the peculiar substances whose characteristics are dependent on the rate of loading, dynamic tests have always been of great importance, and measurements of dynamic modulus and internal friction have been made in many laboratories (166-168). Some investigators have focused their attention in particular on one fast stretching or retracting stroke and by means of high-speed photography have discovered, for instance, that a contracting rubber band does not do so evenly, but in some sort of wave form (169-171).

Conclusions

To conclude, it might be well to remember that all this almost unbelievable development was made in a single year on a product originally used by Indians to make waterproof bags for Spanish gold (172), a product first made synthetically in a laboratory some 35 years ago (173), that today approaches an annual production figure of 1,000,000 tons. And yet the future is unlimited; with natural rubber returning in ever-increasing quantities, with ample raw materials for the manufacture of synthetics and rubber chemicals (174-178), and with research to point the way, we may well look forward to boundless advances in rubber.

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THE WAR FORCED PORTUGAL TO SUPPLY BY HOME PRODUCTION needs formerly met by importation. Bicycle tires, especially, which were formerly supplied by England, now are largely provided by domestic factories. However neither the quantity nor the quality of available home-produced tires appears to be satisfying consumers, and it is predicted that foreign tires will be imported again as soon as possible.

Natural Rubber from Russian Dandelion[1]

Roderick K. Eskew[2]

A GREAT deal has been published during the past three years regarding the various sources of natural rubber which have been called upon to supplement this nation's stockpile and to meet those special needs for which commercial synthetic rubbers are not entirely satisfactory. We have read of the wild rubbers being brought in under great difficulty from Central and South America, of the 32,000 acres of guayule grown by the government, largely in California, and now nearly ready for harvest, and of the large experimental plantings of *Cryptostegia* that were made in Haiti. Almost nothing, however, has appeared regarding a plant which is known to be potentially rich in high-grade rubber and which has been extensively cultivated outside this country. This is the Russian dandelion, or *Taraxacum kok-saghyz*.

In the course of a systematic investigation instituted in Russia in 1929 to determine the possibilities of producing natural rubber in that country, the *kok-saghyz* was found near Tien Shan, Kazakstan, near the border of China. By 1932 more than 2,000 acres of this plant were under cultivation in Russia, and it is reported that at the time of the German invasion of Russia approximately 200,000 acres of *kok-saghyz* had been planted for the production of rubber.

Shortly after the tragedy at Pearl Harbor the United States Government started negotiations with Russia to obtain *kok-saghyz* seed. These eventuated in the arrival in Washington on May 8, 1942, of two gunny sacks of seed flown from Kuibyshev. On the same day the seed arrived some of it was repackaged and distributed by air to various points in the United States, where more than 60 indicator plantings were established through cooperation with state agricultural experiment stations.

It was shortly prior to this time that the Emergency Rubber Project was authorized by Congress. It was "An Act to provide for the planting of guayule and other rubber-bearing plants and to make available a source of crude rubber for emergency and defense uses . . ." The responsibility for the Emergency Rubber Project was delegated by the Secretary of Agriculture to the Forest Service. The Forest Service in turn called upon other bureaus in the Department for assistance in certain phases of the work. The task of carrying out agronomic and plant improvement research was assigned to the Bureau of Plant Industry, Soils, and Agricultural Engineering. The Bureau of Agricultural and Industrial Chemistry was charged with the responsibility for developing methods for recovering the rubber from these plants, for determining the technical feasibility of such methods by pilot-plant operations, for evaluating the rubber obtained, and for determining the economic factors involved in rubber recovery. These responsibilities were in turn delegated to the Eastern Regional Research Laboratory at Philadelphia. Thus, when the first *kok-saghyz* roots were harvested in the Fall of 1942, they were shipped to the Laboratory at Philadelphia for rubber-recovery studies.

In spite of the late planting of the seed and the unsatisfactory nature of some of the planting sites, sufficient roots were obtained to permit working out on a batch pilot-plant scale a comparatively simple process for recovering the rubber. A large-scale continuous pilot-plant unit was designed and erected at the Philadelphia Laboratory, and during the Winter of 1943 and 1944 a sufficient quantity of the rubber was produced to permit its commercial evaluation. The roots for these large-scale experimental operations were derived largely from more than 600 acres of *kok-saghyz* planted by the Forest Service, principally in Michigan and Minnesota.

Analysis of typical one-season *kok-saghyz* plants showed that more than 90% of the rubber is in the form of latex in interconnecting ducts in the root itself. The remainder is in the crown and leaves of the plant, which constitute about 25% of its dry weight. This leaf and crown fraction, however, is rich in pectin, containing nearly 40% of the total pectin in the plant. Since pectin interferes with rubber recovery, the tops were mechanically cut off in the field just before harvesting. This practice also reduces the bulk to be handled in the factory.

The rubber-recovery process described here thus applies only to the roots of *kok-saghyz*. Individual *kok-saghyz* roots having as much as 23% rubber hydrocarbon on the dry basis have been grown in this country. Such a high rubber content, however, is exceptional. Most of the roots processed in the pilot plant contained between 5% and 10% rubber hydrocarbon on a dry basis. The roots are also rich in carbohydrates; the amount depends, among other things, on the time of harvest; it ranges from 10% in roots harvested in the spring to 45% in fall-harvested roots.

Before discussing the recovery process for *kok-saghyz* rubber, it is necessary to give some consideration to the localities in which the roots may be grown and the seasons of harvesting. Although much remains to be done toward perfecting methods for growing *kok-saghyz* of high rubber content and high yields per acre, it has been grown experimentally during the winter months in certain parts of Florida and during the summer in the Red River Valley of Minnesota, in certain sections of Michigan, Wisconsin, and Montana.

For reasons of simplicity the following discussion will be based upon probable growing conditions in Minnesota or Michigan. It is assumed that the seed would be planted in the field as early as possible in the spring, preferably prior to June first. Harvesting of approximately 50% of the roots planted would take place between October 15 and November 15. The remaining roots would be left in the ground until the following spring and would be harvested as nearly as possible between April 15 and May 15, with the next seeding following immediately.

Roots left in the ground during the winter generally increase percentage-wise in rubber, even when harvested early the following spring. This condition is undoubtedly due in part to a corresponding loss of carbohydrates resulting from renewed top growth.

In order to preserve the carbohydrates during storage of harvested roots, the full six months' supply harvested in the fall, and a similar quantity harvested in the spring, would have to be dried during each harvesting period. The roots could be washed by simple devices already worked out for field operations. They could then be spread on the ground to a depth of approximately one foot and left to dry, with occasional turning if necessary, to as low a moisture content as weather conditions permit. This practice is necessary to minimize the drying capacity that would be required in a factory drying roots immediately after washing; such roots contain about 85% moisture.

After drying, some roots would go immediately into process, and the remainder would be baled for storage.

Rubber-Recovery Process

The first step of the process consists in countercurrently leaching the dried roots in hot water to remove the carbohydrates. This produces a solution which can be fermented directly to alcohol. A small amount of soda ash is used during leaching to soften the roots. The leached roots, now only about 55% of their original dried weight, are given a short pebble milling in water to disperse the softened plant tissue

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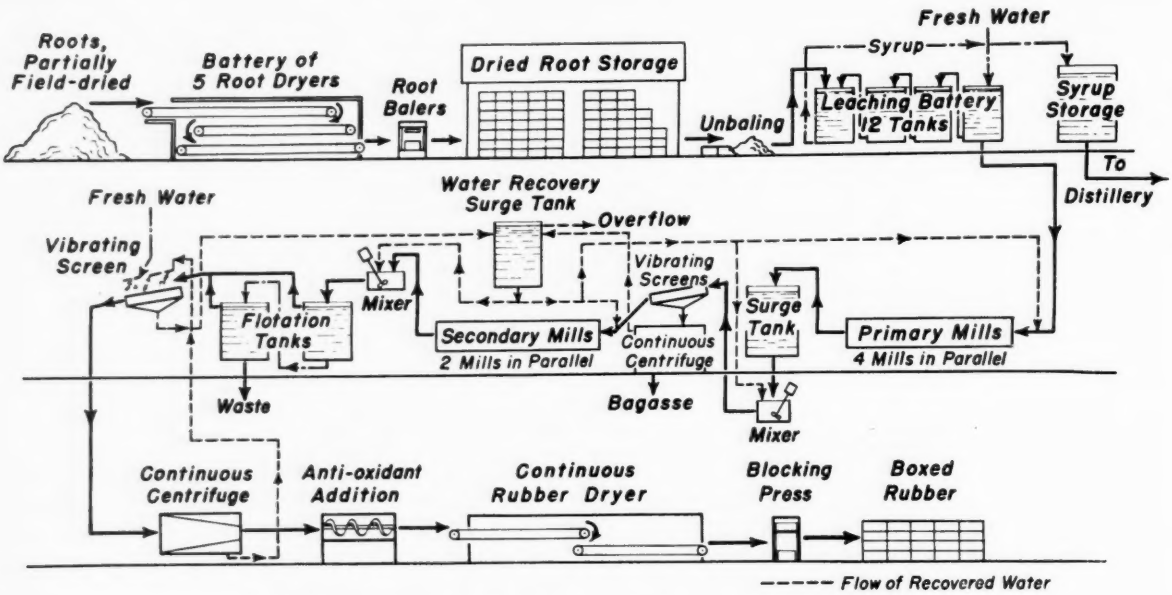

Fig. 1. Flow Diagram for Kok-saghyz Factory—10 Long Tons of Rubber Per Day

and to roll together the fine filaments of rubber. By diluting this slurry and screening it, 65% of the remaining solids are eliminated, leaving largely rubber and adhering root skins. A second short pebble milling with water disengages the root skins from the rubber, and the two are separated by a subsequent flotation step wherein the rubber floats and the plant debris (bagasse) sinks. A final washing of the rubber on a vibrating screen removes further traces of plant material. After being centrifuged to remove excess water, the rubber is mixed with an antioxidant and then dried in a through-circulation continuous drier. It is then baled and boxed in the conventional manner. A flow sheet of the process is shown in Figure 1.

Root Drying and Storage

Freshly washed roots or roots which have been partly field dried can be satisfactorily dried to the desired final moisture of approximately 15% in a continuous through-circulation belt-type drier at temperatures up to 200° F., preferably with the relative humidity maintained at approximately 10%.

The dried roots are baled and stored. They may be kept up to six months or more without any change in the quantity or quality of recoverable rubber. Some loss in carbohydrates can be anticipated, however, when storage is continued beyond three or four months.

Leaching

Leaching is carried out countercurrently in a battery of 10 to 12 tanks using water of 200-212° F. containing about 0.1% soda ash. The function of leaching is threefold:

(1) When conducted countercurrently on fall-harvested roots, it removes the carbohydrates and recovers them in such a concentration as to provide a by-product material fermentable to alcohol or to lactic acid.

(2) It reduces the dry weight of material going to the rubber-recovery system by eliminating soluble solids.

(3) The soda ash used in the early stages of leaching softens the root and facilitates pebble milling.

Milling and Screening

Although rubber can be isolated from leached *kok-saghyz* roots by a pebble-milling process alone, it is much simpler and more economical to intersperse a dilution and a screening step between two continuous pebble-milling operations. If rubber were isolated by milling alone, the total milling time would be three or more times as great as that required for two-stage milling with intermediate dilution and screening.

In the primary milling operation the object is to roll together the coagulated filaments of rubber and to disperse plant material, particularly the softened pulpy portions of the roots, so that on dilution they can be eliminated by screening. This can ordinarily be accomplished by milling for 15 minutes in a continuous pebble mill with a ratio of 20 parts of water to one part of solids. The temperature of the mill slurry is maintained at approximately 100° F. by heating the water going into the mill. This elevated temperature softens plant tissues and reduces the consistency of the slurry, thereby facilitating milling.

The completeness of primary milling can be judged by examining the weblike rubber masses emerging from the mill. When these are stretched and examined under low-power magnification, secondary phloëm can be readily observed. Primary milling should be carried to the point where the web of rubber becomes flattened and, when stretched, reveals almost complete elimination of secondary phloëm. At this stage approximately 50% of the total rubber floats when the slurry is diluted to about 100/1.

About 65% of the root solids can be removed by screening the slurry from the primary mill after diluting it with 100 parts of water to one part of solids. A twofold purpose is accomplished by this operation. First, the subsequent milling load is reduced by 65%, and furthermore less plant material remains to contaminate the rubber. The screening operation is a very important step, and unless it eliminates at least 60% of the solids, secondary milling will be adversely affected, and a greatly increased milling time will be necessary to cause the rubber to float. The factors affecting good screening are (1) kind of roots, (2) effectiveness of leaching and proper control of pH during leaching, (3) completeness of primary milling, (4) slope, stroke, mesh, and weave of screens, and (5) rate of feed to the screens. The water passing through the screens contains approximately 0.6% of plant material. It can be clarified in a continuous centrifuge, the water reused, and the solids recovered if they prove to have by-product value.

Since most of the material passing over the screen is rubber and adhering root skins, the function of secondary pebble milling becomes one of detaching fragments of root skins in order that they may be eliminated in a subsequent flotation step. Secondary milling is ordinarily carried out for about 22 minutes at a water to solids ratio of 22:1; the temperature of the slurry is maintained at about 75° F. Higher temperatures than this tend to soften the rubber, resulting in the formation of balls and entrapment of foreign material. The yield of rubber in the recovery process de-

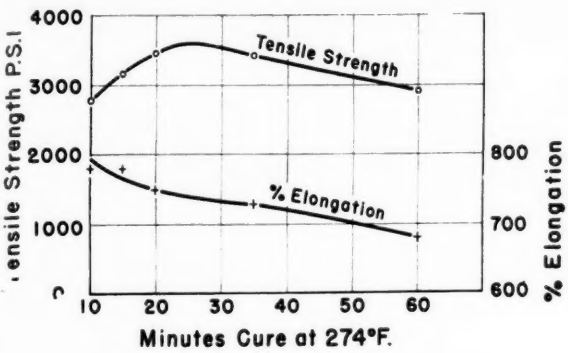

Fig. 2. Curing Curve for Kok-saghyz Rubber

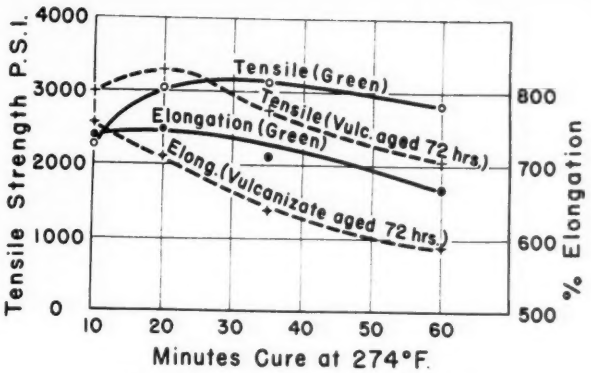

Fig. 3. Aging of Kok-saghyz Vulcanizate

pends upon how effectively it can be floated away from plant debris. Since its floatability depends upon the degree to which non-rubber constituents have been eliminated, the completeness of secondary milling is judged by how completely the rubber floats when a sample of the slurry from the mill is diluted with a large excess of water.

Flotation

The flotation step, which comes immediately after the secondary milling, permits the rubber to float away from the plant debris, which sinks. The effluent slurry from the secondary pebble mill, diluted to about 100 parts of water per one part of solids, is introduced at the center and beneath the liquid level in a continuous flotation tank. Because some of the plant materials sink very slowly, the rate of slurry feed to the flotation tanks is relatively slow. The rubber is skimmed continuously from the surface of the tank by slow-moving blades that dip about two inches below the level of the liquid. At the bottom of the same shaft is a revolving scroll, which continuously moves the debris to the discharge outlet at the center of the tank. It is pumped from this outlet to a secondary flotation tank, designed exactly like the first, where any rubber entrapped in the sediment is freed to float. Two tanks in series should recover practically all the rubber if secondary milling has been properly performed. Otherwise undermilled rubber, which does not float, is lost in the bagasse.

The floated rubber is rinsed with water sprays on a vibrating screen preparatory to drying.

Rubber Drying

Because of the physical state in which *kok-saghyz* rubber is recovered, it lends itself readily to rapid drying at relatively high temperatures without deterioration. Prior to drying, it is desirable for reasons of heat economy to free the rubber of as much water as possible by centrifuging. The moisture content can be reduced to between 40 and 48% without causing the rubber to stick together if the centrifugal force is kept below 100 times that of gravity.

To prevent the rubber from being degraded during drying and to enhance the physical properties of the vulcanizate, it is customary to add an antioxidant to the dewatered rubber. 4-4′-diaminodiphenylmethane is an effective agent, and it is customarily added in the form of an aqueous emulsion, which is sprayed on the rubber. A sufficient quantity is added to give a concentration of approximately 0.45% on the dry-rubber basis.

The rubber is dried in a continuous through-circulation belt-type drier at a temperature of approximately 200° F. The time required is about 45 minutes. *Kok-saghyz* rubber, when dried in this manner, has better physical properties than when dried slowly under vacuum. The rubber is baled and boxed in the conventional manner.

Physical and Chemical Properties of Kok-saghyz Rubber

Rubber produced by the foregoing process had the following average analysis:

	%
Rubber hydrocarbon (by bromination)	80.5
Benzol-insoluble material (by direct determination)	12.5
Acetone-soluble material (by difference)	7.0

The benzol-insoluble material can be reduced to 5% or less by an additional pebble mill scrubbing, but unlike the benzol-insoluble material in guayule rubber, which is in part fibrous and woody and hence harmful, this fraction in *kok-saghyz* rubber is unobjectionable. It consists principally of finely divided, soft, inert material which acts like so much filler.

Although the percentage of acetone-soluble material of *kok-saghyz* rubber is high, as compared with *Hevea*, this fraction is not resinous, or does it contribute objectionable properties such as softness or excessive tack. It consists largely of an unidentified white crystalline substance dissolved in the rubber.

In testing the physical properties of *kok-saghyz* rubber, both the A.C.S. and the A.C.S. alternate formulae give curing curves which are too flat for good evaluation. Satisfactory results were obtained by curing at 274° F. and adding 0.1% diphenylguanidine to the modified A.C.S. formula. The physical test data given below are therefore based on the following formula:

	Parts
Rubber	100
Zinc oxide	6
Stearic acid	4
Mercaptobenzothiazole	0.5
Diphenylguanidine	0.1
Sulphur	3.5

A.S.T.M. recommendations were adhered to with the exception that compounding was done on a four- by eight-inch mill. Figure 2 shows a typical tensile strength-curing time curve for *kok-saghyz* rubber containing 0.4% of 4-4′-diaminodiphenylmethane. Some of the physical properties are as follows:

	Tested 24 Hrs. after Cure	Raw Rubber Aged Before Compounding (48 Hrs. in O_2 at 70° C. & 300 P.S.I.)
Cure at 274° F.	20 min.	35 minutes
Optimum tensile	3420 p.s.i.	3100 p.s.i.
Modulus at 600%	1560 p.s.i.	1930 p.s.i.
Ultimate elongation	750%	690%
Hardness (durometer)	43	44

When *kok-saghyz* rubber is compounded with an appropriate antioxidant, the aging properties of the vulcanized rubber compare favorably with those of *Hevea*. Figure 3 shows the changes in tensile strength and elongation which result when the vulcanizate from *kok-saghyz* rubber, compounded according to the foregoing formula plus 0.25 part of 4-4′-diphenylphenylenediamine as an antioxidant, is aged under the very severe conditions of 72 hours in oxygen at 70° C. and 300 p.s.i.

Laboratory tests on a new rubber are obviously of limited significance. Consequently the Department of Agriculture made arrangements with two large rubber companies to

fabricate, in factory equipment, tires made entirely from *kok-saghyz* rubber produced in pilot-plant operations at the Eastern Regional Research Laboratory.

The B. F. Goodrich Co. fabricated and tested 6:00-16 four-ply passenger car tires. The road tests were made with 30% overload and an operating speed of 60 miles an hour. Their report on this work states in part:

"1. Russian Dandelion Rubber is the most promising substitute for natural[3] rubber which has thus far become available. This statement is based on a general rating of four materials as substitutes for natural rubber:

"(a) Russian Dandelion Rubber.
"(b) GR-S.
"(c) *Cryptostegia* Rubber.
"(d) Guayule.

"Dandelion Rubber is superior to GR-S in physical characteristics, in factory processing, in building tack, and in most tire performance characteristics.

"Dandelion Rubber is superior to guayule in building tack. Guayule cements used as tackifying spreads on the carcass plies of GR-S tires produce unsatisfactory building characteristics. A Russian Dandelion cement used similarly produces building characteristics equal to those produced by natural rubber cements.

"2. Russian Dandelion Rubber in tires is superior to GR-S and approaches the performance of natural rubber in the following characteristics:

"(a) Tread wear, on the road.
"(b) Tread crack growth, on the road.
"(c) General performance, on the road.
"(d) Tread crack growth, on the indoor machine.
"(e) Tread tensile strength, at R.T. and 212° F.
"(f) Carcass ply adhesion.

"Russian Dandelion Rubber in tires gives performance equal to that of GR-S and of natural rubber on the Carcass Separation Test on the indoor machine."

United States Rubber Co. made and tested 9:00-20/10 rayon cord truck tires and subjected them to road tests at between 45 and 55 miles per hour with loads up to 50% above normal load. Their report states in part:

"By far the most interesting fact is that *kok-saghyz* carcass ran extremely well under severe conditions and we should be greatly pleased if we had a large supply of *kok-saghyz* available now for use in the carcass."

These comments by experts in the rubber industry leave no doubt as to the high quality of *kok-saghyz* rubber.

The Cost of Kok-saghyz Rubber

We have stated that *kok-saghyz* can be satisfactorily grown in this country, that it contains a relatively high-grade rubber, that this rubber can be isolated by a practical process, and that it can be satisfactorily fabricated into high-grade tires. The question then arises, What will *kok-saghyz* rubber cost? This cannot be answered at present since the largest factors in the final cost of rubber, that is, the cost of growing the roots and the yield of rubber per acre per year, could not be adequately determined in the short time available for study. We can, however, make a reasonable estimate of the average cost of producing *kok-saghyz* rubber from roots of an assumed rubber content delivered to the factory.

Assuming a rubber hydrocarbon content on a dry basis of 10.0% in fall-harvested roots and 13.4% in spring-harvested roots, the estimated cost of producing one pound of *kok-saghyz* rubber would be approximately 11.7c; a credit for the fermentable carbohydrates of 2.5c per pound of rubber would result in a net cost of 9.2c. This is based upon the harvesting cycle previously described in this article and includes amortization and all other costs except that of growing, harvesting, and transporting roots to the factory. A factory producing 10 long tons of *kok-saghyz* rubber per day and operating 300 days per year would serve a planting area of approximately 40,000 acres and would cost about $1,800,000.

The foregoing assumptions are fairly conservative. Given sufficient time for breeding and selection studies, a rubber hydrocarbon content on a dry-root basis of 15% for fall-harvested roots and 19.5% for spring-harvested roots might reasonably be anticipated; this would reduce the factory cost of producing a pound of rubber from 9.2 to about 7.4c. Such an increase in rubber content would likewise reduce the field costs per pound of rubber.

As already pointed out, *kok-saghyz*, among other rubber-bearing plants, was included in the Emergency Rubber Project "to make available a source of crude rubber for emergency and defense uses." By 1944, however, it became apparent that "while the experimental data indicated that *kok-saghyz* holds promise of significant amounts of high-grade rubber after improvement by selection and breeding, it could not contribute sufficient quantities of rubber to emergency war requirements."[4]

Hence the Emergency Rubber Project work on *kok-saghyz* was terminated on June 30, 1944. However the Bureau of Plant Industry, Soils, and Agricultural Engineering, in its regular Rubber Plant Investigations' work, is continuing on a limited scale the selection and breeding of high rubber-bearing strains of *Taraxacum kok-saghyz* and its cognates *T. megalorrhizon* (*krim-saghyz*), and *Scorzonera tau-saghyz*.

It is estimated that in time the yield of rubber per acre per year from the best of these Russian dandelion-like plants should equal or exceed that from guayule. If this be true, we might then have an annual crop which in an emergency could be expanded rapidly to yield significant quantities of high-grade natural rubber.

[3] Wherever "natural" rubber is mentioned in this quoted excerpt, commercial grades of estate rubbers are indicated. **Kok-saghyz, Cryptostegia**, and guayule are all natural rubbers.

[4] Report of the special subcommittee of the House Committee on Agriculture. Jan. 2, 1945. House of Representatives Report No. 2098.

Applying Certain Antioxidants

(Continued from page 512)

The concentration of Tonox recommended for application to the surfaces of the pressed-rubber blocks is 0.03-gram per square inch of surface. As has been emphasized in the discussions of the results of testing this method, while this amount of antioxidant provides protection against degradation, the final concentration, when applied to the hundred-pound commercial block, is insufficient to exert any significant activating effect. With the small laboratory-mill batches, there was no evidence of a lack of uniformity in the stock due to unevenness in the milling of the small quantity of activating agent into the batch. However, if larger quantities of antioxidants are used, or if surface samples only are removed from the blocks for testing, the activating properties of the preservative may then become evident.

Conclusions

It is concluded that the primary aromatic amine, Tonox, may be applied to wet rubber at a concentration of 0.5% (dry-rubber basis) colloidally dispersed in water and applied as a spray, to yield the same stiffening effect on the product heretofore obtained by spraying the same concentration of Tonox as an acetone solution. The newer method provides a more economical and less hazardous practice.

If a soft, pliant rubber is required for certain limited applications of the product, good storage of guayule crude may be obtained without imparting stiffness by protecting the rubber during drying with relatively low concentrations of JZF applied as aqueous colloidal dispersions followed by surface treatment with Tonox of the finished rubber blocks. The latter antioxidant may be applied as a paint-like mixture of aqueous dispersion of suitable concentration with sufficient talc to permit the application of a single coat that contains a given quantity of Tonox per unit area.

The authors gratefully acknowledge the cooperation of F. E. Clark and assistants in the physical testing of the rubber employed in these tests, and the help of others in reviewing this paper.

An Improved Brittle Point Apparatus

F. L. Graves[1]

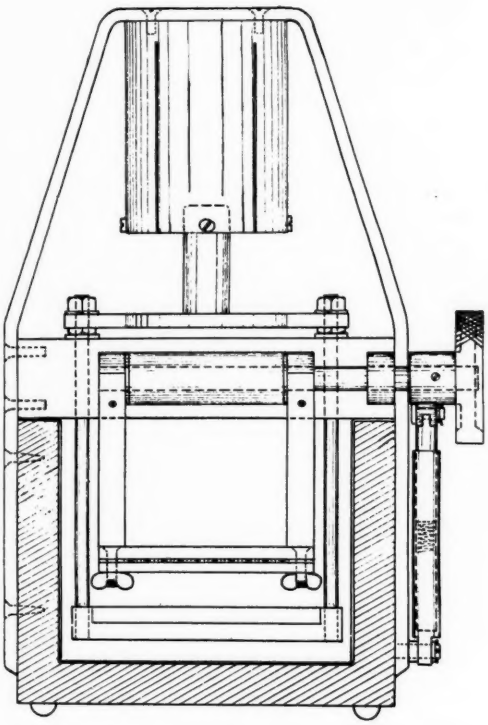

Fig. 1. Improved Cynamid Brittle Point Apparatus—Front View—Inside Tank

IN THE paper "Evaluating Low Temperature Stiffness and Brittle Point in Elastomers"[2] several methods for determining the brittle points of rubber and rubber-like compounds were reviewed, and the apparatus developed in these laboratories in 1942 for this test was described in detail.

The original device represented a step toward evaluation of this property under more uniform conditions of rate and degree of deformation than had hitherto been employed. The instrument consisted of a temperature conditioning bath containing a convenient speciman clamp and a spring loaded plunger mechanism designed to bend several test pieces through an arc of 90 degrees at a high rate of deformation.

The need of a more powerful plunger action became apparent when the A.S.T.M. in its method of Test D746-44T adopted as a tentative standard the impact rate of 6½ ± ½ feet per second for brittle point determinations. At a meeting of Subcommittee XXV of Committee D-11 in Cincinnati in March, 1944, the use of the motor-driven striking arm developed by Kemp, Malm, and Winspear[3] was discussed, and the possibility of an A.C. solenoid as a power source for the impact blow was also proposed.

For its simplicity in design and operation the solenoid was chosen by us to replace the spring loaded plunger employed in the original apparatus. This power source has also been employed in a similar instrument developed by Bimmerman and Keen.[4]

The Cyanamid brittle point apparatus combines an easily manipulated specimen holding mechanism with a sufficiently powerful solenoid to bend or break as many as ten specimens with a single impact stroke. The instrument is compact and portable and may be placed in the well of a small commercial cold air cabinet for first-order transition studies or other tests in which liquid cooling media are to be avoided.

The design of the device is shown in the accompanying sketches. (Figures 1 and 2). A specimen clamp to accommodate up to ten T-50 test specimens is mounted on a shaft to which a compression spring locking device is attached. Clockwise rotation of the wheel at the right end of the shaft (Figure 1) brings the specimen holder out of the conditioning bath where it is automatically secured in a convenient position for rapid inspection and reloading. Counterclockwise rotation of the control wheel lowers the loaded clamp into the bath, automatically locking the specimens as cantilever beams in a horizontal plane above the impact plunger.

Closing the circuit to the solenoid (110-volt A.C.) causes the plunger to strike the under side of the specimens at a distance of ¼-inch from the clamp, bending those which remain flexible through an arc of 90 degrees. High-speed camera studies of the plunger action against ten specimens of a GR-S tire tread compound at 2° C. above the brittle point indicated that a speed of 6½ ± ½ feet per second is attained at the moment of contact and maintained throughout the bending operation as required by A.S.T.M. for this test.

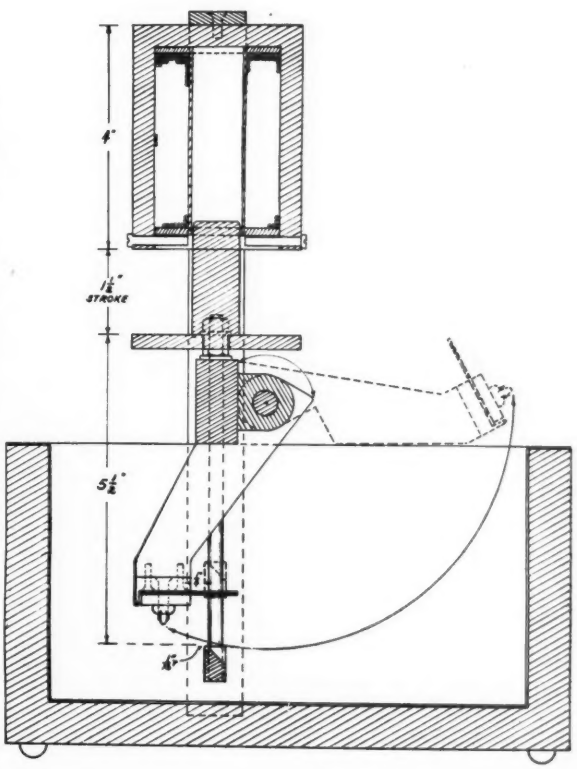

Fig. 2. Improved Cynamid Brittle Point Apparatus—Side View—Section at Center

[1] Stamford, Conn., research laboratories, American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y.
[2] Graves and Davis, INDIA RUBBER WORLD 109, 41 (1943).
[3] Ind. Eng. Chem., 35, 488 (1943).
[4] Ind. Eng. Chem. (Anal. Ed.), 16, 588 (1944).

EDITORIALS

The Outlook for 1946

IT APPEARS more than likely that rubber, which continued to hold the spotlight of public interest during the year 1945, will be just as much before the public eye during 1946. The ending of all tire rationing on December 31 has already brought down upon the rubber manufacturing industry a virtual avalanche of consumer demands for new tires. In view of the fact that the industry does not expect to have fully normal stocks of tires until late in 1946, much effort will be required by the tire manufacturing companies and the tire dealers to discourage indiscriminate buying of tires and to stress continued tire conservation for many months.

Then there is the question of availability of new postwar products of the industry, which, it is also reported, will not be produced in very great volume until 1947. It will be necessary for the industry to explain to the public, thoroughly and often, why such things as latex foam sponge and numerous new products embodying combinations of various rubbers and plastics do not appear on the market quickly and in ample volume, if public goodwill is to be retained during the difficult year of 1946.

The synthetic rubber passenger-car tire will get its real test during the year as the volume of these tires on the passenger cars and trucks of the country reaches a really significant figure. The results of this test will have as much effect on the balance between the use of natural and synthetic rubbers as the efforts for lower costs and higher quality by the production and technical men for both types of rubber.

Capacity production of most regular rubber products is anticipated by mid-1946, but this is dependent on some measure of labor peace. Since the settlement of labor and wage increase disputes in all industries seems to be dependent on the outcome of the General Motors strike, recent comment that this strike may be settled by granting a wage raise in the neighborhood of 15 or 20% in return for a guarantee by the union against wildcat strikes, may be a hopeful sign that production stability may be attained during the first half of the year. The comments of two industry leaders in their year-end statements are noteworthy in this connection. John W. Thomas, chairman of the Firestone Tire & Rubber Co., in his comment on the outlook for the new year said:

"Management and labor will have to display a reasonable attitude in their common problems, and, naturally, the government will have to use great skill in its timing of the proper removal of price controls, and in its adjustment of the delicate economic mechanism."

P. W. Litchfield, chairman of the Goodyear Tire & Rubber Co., although quite pessimistic regarding the current outlook, hit on the real solution when he said:

"Accurate forecasting of business and employment is made impossible by the wave of strikes and fomented unrest. The paradox is that while almost everyone recognizes the nature of our problems, effective steps are not being taken on a national scale to meet them.

"In 1946 we have two choices: we may go forward or we may drift into dangerous conditions. *If the Americans who worked together so magnificently in the winning of the war can reunite for the peace, all will be well.* But unless a much higher degree of domestic unity begins to take form soon, the outlook for 1946 is not at all encouraging."

It is the opinion of the editor of INDIA RUBBER WORLD that the Americans who did work together in such a tremendous way in winning the war will, after the adjustments of the postwar period have been made, reunite for the peace and the prosperity that most surely lie ahead. It is only common sense for Americans to realize that with domestic unity, there is much to be gained; while with continued strife everyone will be the loser. There is nothing that the average American citizen, whether he be a businessman, worker, or public official, takes greater pride in than his reputation for practical common sense.

An Encouraging Sign

ON SEPTEMBER 8, 1945, John W. Snyder, Director of the Office of War Mobilization and Reconversion, appointed an Inter-Agency Policy Committee on rubber for the purpose of recommending to the OWMR a coordinated national policy on rubber. In the November issue of INDIA RUBBER WORLD attention was called to the formation of this Committee, and it was strongly recommended that all companies and persons who felt that they had something to contribute to the formation of our national policy on rubber should communicate with the Committee as soon as possible.

It is therefore most encouraging to note in a recent announcement from this Policy Committee that not only have numerous individuals been consulted informally already, but that public hearings on rubber requirements and supply, production costs of natural and synthetic rubber, and related subjects will be held on January 8, 9, and 10 at the Social Security Building in Washington, D. C.

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Scientific and Technical Activities

A.S.M.E. Rubber & Plastics Meeting Well Attended

THE two half-day sessions of the National and Metropolitan Rubber and Plastic Divisions of the American Society of Mechanical Engineers, held as a part of the annual meeting of the Society at the Hotel Pennsylvania in New York, N. Y., November 27, attracted an attendance of more than 200 persons at each of the sessions. The meetings were in charge of E. F. Riesing, Firestone Industrial Products Co., chairman of the National Rubber and Plastics Division, and F. L. Yerzley, Western Electric Co., chairman of the Rubber and Plastics Division of the Metropolitan New York Section.

The chairman for the morning session on plastics was James R. Turnbull, of Monsanto Chemical Co. The first paper, on "Physical Properties of 'Plaspreg'," by John Delmonte, of the Plastics Industries Technical Institute, described the preparation and properties of a new furane resin-impregnated plaster of Paris material reported to cost about 1c a pound, to compare favorably with liquid cast resins and to be applicable to forms of almost any size. The next paper, "Effect of Molding Pressure and Resin on Results of Short-Time Tests and Fatigue Tests on Compreg" by W. N. Findley, W. J. Worley, and C. D. Kacalieff, of the University of Illinois, outlined tests performed on six samples of compressed-impregnated plywood, including static tension tests, static compression tests, static torsion tests, and rotating beam type of fatigue tests. The concluding paper of the morning session, "Advances in Plastics during 1945," was given by R. J. Moore, of the Bakelite Corp. Dr. Moore explained many of the new developments in plastics of the past year including heatronic molding, low pressure and contact pressure molding, cellular core laminates, new resins and new products made from plastics, in many cases exhibiting samples.

The afternoon session on rubber was presided over by F. J. Krebs, of United States Rubber Co. The first paper, "Foam Sponge Rubber — Manufacture and Application" by W. L. Jantzen, of U. S. Rubber, gave a general description of the process by which this product is made directly from latex rubber. The different degrees of resiliency or density of latex foam sponge suitable for various applications were then discussed; then fabricating and testing were described. The next paper, "Creep of Neoprene in Shear under Static Conditions" by W. N. Keen, of E. I. du Pont de Nemours & Co., Inc., gave results of tests on neoprene stocks over a period of three years and nine months. It was reported the neoprene's major deformation took place relatively early, after which the creep rate decreased. Natural rubber, on the other hand, showed an acceleration of the rate of creep as the testing time was lengthened. In addition the rate of creep of neoprene can be diminished by increasing the cure, preconditioning the neoprene compound with heat and changing the composition of the compound.

The results of a very interesting investigation on the relation between the static strength of the automobile and its "feel" on the road were given in a paper on "A Vibration Investigation" by Lloyd E. Muller, of the Buick Division of General Motors Corp. Mr. Muller explained how with noise analyzing equipment and strength test data, a satisfactory type of body-bolt insulation was developed and used successfully in production. The final paper at the afternoon session, "Advances in Rubber during 1945" by Ernest Chilton, of the Firestone Tire & Rubber Co., reviewed the latest developments and advances in rubber covering new materials, processes, and products. The complete paper will be found in this issue of INDIA RUBBER WORLD.

At a meeting of the executive and general committees of the Division, James H. Booth, of Thompson Products, was elected chairman for 1946, and H. M. Richardson of Debell & Richardson, was elected secretary. It was decided to hold two sessions of the Division in connection with the semi-annual meeting of the Society scheduled for June 17-20 at Detroit, Mich., and two sessions of the Division during the annual meeting, December 2-6, in New York.

Seminar on Chemical Economics

A GROUP of 13 specialists from industry will participate in a graduate seminar entitled "Chemical and Engineering Economy" which will be offered by the Polytechnic Institute of Brooklyn on Thursday evenings, starting February 7. The course will be directed by Robert S. Aries, consulting engineer and research associate at the Institute, and will include such topics as the preparation of economic surveys and appraisals, plant location, cost analysis and estimates, distribution, transportation, and containers. Other topics to be studied will be the interpretation of financial statements, cost accounting, purchasing, marketing and marketing research, organization and control structures, and the interrelations between these functions and chemical research and production.

The 13 specialists who will lecture during the course include: L. W. Bass, director of research, U. S. Industrial Chemicals, Inc.; Charles O. Brown, consulting engineer; W. H. Carrier, chairman of the board, Carrier Corp.; Gustavus J. Esselen, consulting engineer; Paul L. Gomory, patent attorney, Sun Oil Co.; Willard H. Dow, president, Dow Chemical Co.; John W. Happel, chief project engineer, Socony-Vacuum Oil Co.; William Haynes, chemical economist; Walter J. Murphy, editor, *Industrial and Engineering Chemistry*; J. G. Park, vice president, Standard Alcohol Co.; Walter von Pechmann, works manager, Ansco Division, General Aniline & Film Corp.; John M. Weiss, consulting engineer; and R. B. Wittenberg, manager, chemicals department, International Minerals & Chemical Corp.

Rowzee Addresses Ontario Group

A JOINT meeting of the Ontario Rubber Section and the Toronto Section of the Canadian Institute of Chemistry was held at the Royal York Hotel in Toronto, Ont., December 4. Speaker for the evening was E. R. Rowzee, director of research, Polymer Corp., Sarnia, Ont., who talked on "The German Synthetic Rubber Industry." About 165 members and guests were present at the meeting.

Mr. Rowzee first explained that he was a member of a group of technical representatives sent to Germany with the object of finding out what progress had been made in Germany in the production of synthetic rubber and whether data could be brought back to further the development of synthetic rubber in Canada and the United States. He briefly outlined the early German work on synthetic rubber, which in 1936 and 1937 finally resulted in the construction of plants equipped for the production of 166,000 tons of rubber a year. At Leverkusen a remarkable research laboratory was erected at a cost of $4,000,000. Five hundred technicians were employed at this laboratory. Experimental synthetic rubbers were made, and facilities permitted complete manufacturing through to the finished product for testing.

The German polymerization units for synthetic rubber were generally similar to our own, Mr. Rowzee said. In control of process and in uniformity of product, we were definitely ahead of the German practice. Our GR-S is at least as good as the best German tire rubber, and in processability it is far superior. There was no indication that the Germans had produced a rubber of the GR-I type, and our GR-I is far superior to any rubber used for inner tubes in Germany, it was revealed.

Many of the large processing plants were relatively undamaged. The synthetic rubber producing plants were, however, heavily bombed. Tire production figures illustrated the accuracy of Allied bombing. Production dropped from 250,000 tires in August, 1944, to 80,000 in February, 1945.

With regard to natural rubber in Germany, 65,000 tons were brought in, but the tightening of the blockade reduced this amount to 3,000 tons at the end of the war.

In conclusion, Mr. Rowzee expressed the opinion that it was very likely a considerable percentage of our synthetic rubber manufacturing capacity would remain in operation in order to insure an adequate supply of rubber in the case of another emergency, a more stabilized price for natural rubber, and to provide a more widespread use of rubber than ever before.

The meeting was concluded with the showing of three educational films which are being used in high schools to supplement class lectures, by Professor Croall of the Ontario College of Education.

It was announced that the next meeting of the Ontario Rubber Section will be held at the University of Toronto on January 24.

Hears Railway Research Head

THE Quebec Rubber and Plastics Group, at its regular monthly meeting on November 9, at the Ritz-Carlton Hotel in Montreal, P. Q., Canada, had as the speaker for the evening S. W. Fairweather, vice president in charge of research and development for the Canadian National Railways. The meeting was very well attended with more than 100 members and guests present. E. D. Bent, chairman of the Group, presided and introduced the speaker.

Mr. Fairweather, in his talk entitled "The Practical Aspects of Railway Research and Development," first referred to the fact that industrial research was very much in the forefront these days and added that practically every type of industry has realized the value of the scientific approach to its particular problems. The miracles that have been and are constantly taking place as a result of the work of the great research organizations of the chemical, electrical, and rubber and plastics industries, are, however, not generally expected from the research activities of the railway industry, since that industry is more mature and the period of the miraculous is over, Mr. Fairweather said. Despite this, the railway industry has found it profitable to engage in research activities, both collectively through the medium of trade and scientific associations and groups and also by the setting up of research departments in individual railway organizations.

The speaker then cited some of the progress that had been made by his company by virtue of its research and development activities, such as, decreased fuel consumption, longer-wearing steel rails and wooden ties, increased tractive effort of locomotives, etc. It was also mentioned that of all the new materials now becoming available, those substances generally coming under the head of modern plastics, with which may be grouped natural and synthetic rubber, are very interesting and upon broad avenues of adaption in the railway field. For many years Canadian National has used phenolic types of resins in enamels and paints and more recently has been experimenting with alkyd resins for such purposes. Rubber has been used to a limited extent to reduce shock and vibration, and rubber is also used in large quantities in water, air, and steam hose, it was pointed out. The railway is also a large consumer of plastics in the form of waterproof glues, and while molded plastics have not been used as yet to a large extent, there is no doubt that their use will be expanded, Mr. Fairweather said.

Los Angeles Group Elects

THE Christmas party of Los Angeles Rubber Group, Inc., was held on December 4 in the theater where "The Drunkard" has been playing for many years, and the show was part of the program. Three hundred and forty members and guests attended.

Results of the election of officers for 1946, conducted by a ballot by mail, were announced. Chairman will be C. M. Reinke, Reinke, Heller & Amende; associate chairman, C. R. Wolter, United States Rubber Synthetic Division; vice chairman, P. W. Drew, Goodyear Tire & Rubber Co.; treasurer, P. R. Wineman, B. F. Goodrich Co.; and secretary, H. Carroll Walker, Kirkhill Rubber Co. Directors follow: E. L. Royal, H. M. Royal Co.; C. H. Churchill, B. E. Dougherty Co.; and D. C. Maddy, Hycar Chemical Co. R. E. Hutchinson, the retiring chairman, also becomes a member of the board.

A joint meeting of the old and new boards of directors will be conducted by Mr. Reinke in January. All committee chairmen will also be present.

The Firestone Tire & Rubber Co. will be host for the first 1946 meeting of the Group, scheduled for February 5, at the Mayfair Hotel.

Winning Papers Selected In Chicago Group Contest

THE papers awarded first, second, and third prizes and one awarded honorable mention by the judges of the Chicago Rubber Group's contest for the best methods of utilization of synthetic scrap rubber will be announced at a meeting of the Group scheduled for January 25. At this time the names of the authors of these papers will also be announced, and the prizes presented.

The Chicago Rubber Group has decided that all four of these prize-winning papers will be published in the rubber trade journals, two in INDIA RUBBER WORLD and two in *Rubber Age*. The paper awarded first prize and the paper awarded honorable mention will be published in INDIA RUBBER WORLD, and the papers awarded second and third prizes will appear in *Rubber Age*.

Cotton Cord Tires Give Good Test Results

TRUCK tires made with improved cotton cords gave outstanding performance in government tests conducted during the war years, according to a summary report by testing agencies, including the United States Department of Agriculture's Southern Regional Research Laboratory, New Orleans, La. The improved tires made from selected varieties of cotton stood up under rough driving markedly better than tires made from standard cotton cord. Cotton cord passenger tires were still in good driving condition after nearly 70,000 miles of high-speed driving.

In order to develop a cord satisfactory for synthetic rubber tires, low-gage cotton cord was investigated as tires made from such cord require less rubber and are cooler running. Using selected varieties of low-gage cord fabrics, the first experimental tires were made of 90% synthetic rubber and 10% natural rubber in truck size 7:50-20. These tires were tested in 1943 at the San Antonio, Tex., ordnance testing grounds on 2½-ton trucks carrying 5,000-pound pay loads, and tires were rotated every 800 miles. The test course consisted of 70% paved roads, 15% gravel roads, and 15% cross-country terrian. All experimental tires gave satisfactory results. Tires made with the improved cotton cord gave higher mileage and better impact resistance to rock ledges than control tires made with standard cotton cord. Tires manufactured from cotton of the Stoneville variety were roughly 20% better than those using the standard cord; those made with SXP were 75% better; and those made with Wilds were 132% better. No rayon tires, however, were used in these tests undertaken in 1943.

Later tests were made in 1944 with 6.00-16 passenger-car tires and, in conjunction with rayon cords, on 7.00-20 light truck tires. The improved cords used were made from Wilds cotton. Test results showed rayon and the improved cotton cord to be superior to standard cotton cord in the light truck tires. Rayon cord was slightly superior to the improved cotton cord, but this superiority was believed due to differences in cord construction as no fabric failures occurred.

Standard and improved cotton cords were used in passenger-car tire tests on 1942 sedans run at 60 miles per hour on paved highways. Both types of cords gave entirely satisfactory results, running 68,000 miles with one recapping, and with carcasses still in good condition. Another recapping would have permitted further running, demonstrating that standard as well as the improved cotton cord is entirely adequate for high-speed passenger car driving.

N. Y. Group Christmas Party

ABOUT 500 members of the New York Rubber Group enjoyed a very successful Christmas party held December 14 at the Hotel McAlpin in New York, N. Y. Dinner was preceded by a cocktail hour, after which the Group chairman, Harry Outcault, called on the chairman of the nominating committee, T. A. Bulifant, of the Barrett Division of Allied Chemical & Dye Corp., for the recommendations for election of officers for the coming year. O. J. Lang, of Armstrong Rubber Co., and S. M. Martin, Jr., of Thiokol Corp., were the other members of the nominating committee.

Officers elected for 1946 were: chairman, George J. Wyrough, Whitehead Bros. Rubber Co.; vice chairman, Simon Collier, Johns-Manville Corp.; secretary-treasurer, Peter P. Pinto, *Rubber Age;* and sergeant-at-arms, L. Cranston, United States Rubber Co. Members elected to the executive committee for a three-year term follow: William J. Woodward, American Zinc Sales Co.; J. W. Harrison, Thermoid Co.; and George R. Lawson, Barett Division. Retiring Chairman Harry Outcault, St. Joseph Lead Co., and the retiring secretary-treasurer B. B. Wilson, INDIA RUBBER WORLD, of course become *ex-officio* members of the executive committee.

With the conclusion of the election of officers as the only business of the evening, Mr. Outcault turned the meeting over to Mr. Wilson, who then introduced the master of ceremonies for the entertainment program. The concluding event of the evening was the distribution of 150 valuable prizes to the holders of the lucky numbers. Generous contributions from many rubber and supplier companies and friends of the Group made the distribution of these prizes possible.

Selling Prices of High Solids Experimental GR-S Latex

THREE experimental GR-S latices designated X-270, X-271, and X-276, having a total solids concentration of 50% or more, are being produced on a limited scale at some of the government-owned synthetic rubber plants. Although these experimental high solids GR-S latices are still quite new, having only recently passed from the pilot plant to the production stage, it is expected that requests from latex consumers for permission to purchase these latices will warrant additional production in quantities sufficient to permit tank car deliveries.

In anticipation of such demand the Office of Rubber Reserve, Reconstruction Finance Corp., hereby announces the following schedules of selling prices, effective November 6, 1945, for experimental GR-S latices produced in government-owned synthetic rubber plants and having a total solids concentration of 50% or more:

SCHEDULE A. PRICES FOR SALE OF HIGH SOLIDS EXPERIMENTAL GR-S LATICS BY OFFICE OF RUBBER RESERVE
(For Domestic and Export Purposes)

	Price (Cents per pound, total dry latex solids)
Tank car lots	20¼
Drum lots	26¾
Less-than-one-drum-lots	32¾

All sales by Office of Rubber Reserve, Reconstruction Finance Corp., will be made ex the producing plant at the above prices, plus the applicable uniform freight charge, and shall be subject to the terms set forth in our General Sales and Distribution Circular, dated July 1, 1945, applicable to sales of standard GR-S latex. The Office of Rubber Reserve is not prepared to make shipments in drums or other types of containers ex producing plants in unlimited quantities, but shipment of drum lots and less-than-one-drum-lots will be made by Office of Rubber Reserve until such time as such shipments can be handled as private transactions by the GR-S latex distributers.

SCHEDULE B. PRICES FOR SALE OF HIGH SOLIDS EXPERIMENTAL GR-S LATICES BY GR-S LATEX DISTRIBUTERS
(For Domestic and Export Purposes)

	Price (Cents per pound, total dry latex solids) Not to exceed
Drum lots	26¾
Less-than-one-drum-lots	32¾

All sales by GR-S latex distributers will be made f.o.b. point of shipment and will be handled as private transactions in the same manner as the sale of standard GR-S latex in drums is now handled by said distributers.

As a consequence of the foregoing announcement, the prices for GR-S latices listed in Exhibit E, page 21, and Exhibit F, page 22 of our General Sales and Distribution Circular, now apply only to those GR-S latices having a total solids concentration of less than 50%. However, in accordance with Section 11.20 of our General Sales and Distribution Circular, the initial production of any GR-S latex, including GR-S latices having a total solids concentration of 50% or more, will be sold at the prices listed in the above-mentioned Exhibits E and F.

Although preliminary reports on these new experimental latices have been favorable, the Office of Rubber Reserve makes no representation or warranty of any kind, expressed or implied, as to their use or as to the results to be obtained from such use; however, the Office of Rubber Reserve does warrant that the above described experimental latices will contain at least 50% total dry latex solids.

OFFICE OF RUBBER RESERVE
November 27, 1945.

Description and Availability

	X-270	X-271	X-276
% TDLS	50 to 55	55	58
Butadiene/styrene ratio (approximate)	50:50	50:50	70:30
Emulsifier	Rosin acid	Rosin acid	Rosin acid
Antioxidant	None	None	None
Shortstopper	Non-discoloring	None	None
Use	General purpose	General purpose	General purpose
Availability	Tank-car quantities	Limited	Limited

German Rubbers, Compounding Ingredients Available

A MEMORANDUM on the availability of certain German synthetic rubbers and compounding ingredients has been received and is given below:

Memorandum

"A few months ago a memorandum was distributed to Rubber Manufacturers stating that amounts of various synthetic materials made in the German plants could be obtained free of charge by ordering desired quantities from the Research and Development Section of the Office of Rubber Reserve.

"Reports describing investigations of the German synthetic industry containing complete description of these materials have been issued. However considerable quantities of Buna SS, Buna S, Buna SR and Buna S3, and the carbon blacks CK1, P-1250 are still on hand and amounts up to several hundred pounds may still be obtained for evaluation purposes.

"Requests for experimental quantities of the following compounding ingredients will be filled as soon as possible, orders to be prorated to date of receipt of request should the material run out:

"Koresin
Kautschol
Imbutol ZD or Naftolen ZD
Imbutol NV or Naftolen NV
Plasticator 32 or Buna 32
Vulcacit AZ
Tonerdegel"

New Cyclohexane Derivatives Produced by du Pont

PLANS to investigate organic syntheses involving nitration, nitrolysis, and nitric acid esterification and oxidation to provide new and useful compounds for industry have been announced by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. A program for large-scale semi-works production of new organic derivatives is under way in the explosives department and includes the new cyclohexane derivatives: epsilon-caprolactam, cyclohexanone oxime, and nitrocyclohexane.

Nitrocyclohexane is presently available in lots up to five gallons for experimental purposes. It undergoes typical nitroparaffin reactions and can be hydrogenated at moderate temperatures and pressures to form cyclohexylamine which may be used as an intermediate in the production of plasticizers, solvents, corrosion inhibiters, etc. Its properties are given in the following tabulation:

Boiling point, at 760 mm. Hg	203-204° C. (with slight decomposition)
Boiling point, at 40 mm. Hg	109° C.
Boiling point, at 20 mm. Hg	94° C.
Freezing point	-34° C.
Specific gravity, at 25/25° C.	1.0630
Pounds per gallon, at 77° F.	8.8
Flash point, open-cup	180° F.
Solubility in water at 25° C.	0.15%
Miscible with acetone, alcohol, benzene, cyclohexane, ether, and kerosene.	

Cyclohexanone oxime is available as a white crystalline solid and is an important intermediate in organic reactions involving synthesis of cyclohexyl derivatives. Its properties are as follows:

Melting point	88.5° C. minimum
Boiling point, at 760 mm. Hg	206-210° C. (with slight decomposition)
Boiling point, at 10-12 mm. Hg	100-105° C.
Vapor pressure at 43.5° C.	0.1 mm. Hg
Purity	99.9% minimum

Epsilon-caprolactam is available either as a solid or as a 67-76% aqueous solution. The vinyl derivative is said to have value as a plasticizer and textile assistant. Caprolactam can be chlorinated, sulphonated, methylated, etc., to produce new derivatives. Its properties are:

Melting point	68.5° C. minimum
Boiling point, at 10 mm. Hg	136-138° C.
pH (40% aqueous solution)	4.0 - 6.0
Very soluble in water, acetone, ethanol, benzene, and chloroform.	
Slightly soluble in ether and in carbon tetrachloride.	

Both the lactam and the oxime can be supplied in quantities ranging from pound lots for laboratory use to ton lots for industrial applications.

C.I.C. Forms Rubber Division

THE recently organized Chemical Institute of Canada, through its board of directors, has authorized the formation of a Division of Rubber Chemistry, according to H. G. Deline, of Dunlop Tire & Rubber Goods Co., Ltd., Toronto, who is secretary-treasurer of the new Division. The Institute plans to hold its annual chemical conference in Toronto during June, 1946, and the first major concern of the Division of Rubber Chemistry is to arrange a program for a technical session at this conference. Those interested in joining the C.I.C. Rubber Division or in presenting a paper at this technical session should get in touch with Mr. Deline.

The officers of the new Division are: chairman, N. S. Grace, Dunlop Tire; vice chairman, G. R. Syme, Firestone Tire & Rubber Co. of Canada, Ltd.; secretary-treasurer, Mr. Deline; executive committee, R. E. Hatsch, Polymer Corp.; J. C. Howard, Kaufman Rubber (Ontario), Ltd.; and A. B. Lewis, British Rubber Co. of Canada, Ltd.

Comparison of German Plasticizers with Standard Softener for GR-S[1]

NEAR the end of the war in Europe and since its close, numerous rubber technologists have visited synthetic rubber plants in Germany and forwarded to various Washington departments considerable information concerning synthetic rubber manufacturing in that country. In addition they have shipped to the United States specimens of German rubber compounding materials in order that American rubber technologists may examine and evaluate them.

Among these materials are certain softeners with which American rubber manufacturers are not familiar. The following tests of these softeners were made at the Government Research Laboratories, operated by the University of Akron.

[1]University of Akron, Government Laboratories, Akron, O.

COMPARISON OF GERMAN PLASTICIZERS WITH STANDARD SOFTENER FOR GR-S

	Standard Softener	Kautschol	Imbutol ZD	Imbutol NV
Specific gravity @ 25°	1.08	1.04	0.99	0.99
Absolute viscosity in centipoises @ 25° C.	19	356	13,241	108
% benzene-insoluble	0.34	0.44	0.05	0.02
% fraction of boiling range, 0-210° C.	0	0	0	0
210-235	0	8.3	0	0
235-270	13.6	21.0	0	0
270-315	40.6	31.1	0	5.8
315-355	19.6	30.4	6.3	32.0
Residue	26.2	37.2	93.8	62.1
% tar acid in fraction of boiling range				
0-210° C.	0	0	0	0
210-235	0	67.0	0	0
235-270	15.3	67.4	0	0
270-315	11.5	90.8	0	17.7
315-355	3.6	39.3	1.7	12.9

Plasticizers for Nitrocellulose Caulking and Sealing Compounds

APPLICATION of the Paraplex resins (which proved so successful as plasticizers in caulking and sealing compounds for pressurizing Superfort cabins and insulating high-frequency cables) to the insulation of refrigerators, glass brick constructions, and weatherproofing home window frames has been announced by the Resinous Products & Chemical Co., Philadelphia, Pa.

The first of the series made available on a commercial scale is a permanent, non-oxidizing plasticizer for quality nitrocellulose coatings and is known as Paraplex G-20. Because of its resistance to hydrocarbon solvents, this resin was tested as the major component of sealing compounds for aircraft, gasoline, and oil tanks. In addition it can be formulated to give compounds of a rubbery nature which do not embrittle at low temperatures and which possess satisfactory adhesion to metals such as aluminum. Numerous possibilities have been opened up, also, by virtue of the lack of objectionable odor, resistance to change by ultraviolet radiation, and ease of application over porous surfaces, of this plasticizer.

When heated in an open vessel at temperatures of 125° C. or higher, the material becomes more and more viscous and finally sets to a rubbery gel. For some applications, however, this proved a disadvantage, and a new resin known as Paraplex G-25 was developed to overcome this objection. This product shows the same permanence, nonbleeding, ultra-violet resistance, and adhesion characteristics as Paraplex G-20, but, in addition, Paraplex G-25 possesses enhanced water resistance; it is stable with reactive pigments and is essentially unchanged after prolonged heating at temperatures of 125° C. or higher.

Other resin types include Paraplex AL-111, essentially non-drying, and Duraplex AL-210, which in the mass tends to surface dry, but retains its flexibility through the body of the material. Both of these resins show good adhesion, low odor, good compatibility, and withstand low temperatures. They have a high degree of resistance to water, but not to gasoline. If it is desired to change markedly compatibility and viscosity, these resins can be further processed by blowing or other methods since they are oil-modified alkyds, it was reported.

Sub-Tropical Testing Service

THE South Florida Test Service, Miami, Fla., is available for testing all kinds of materials and products under severely destructive sub-tropical climatic conditions, according to Director Earl M. DeNoon. This test service, established in 1931, is a member of the American Council of Commercial Laboratories and specializes in weathering tests to predetermine durability and permanency by actual exposure to sunlight, atmosphere, and salt water, and service tests under the most severe conditions of corrosion, humidity, and sun attack. During the war this service conducted weathering, light aging, sea water immersion, mildew and rot resistance, and anti-fouling tests on various materials and equipment for ordnance use.

Electrostatic Hazards in the Rubber Industry[1]

THROUGHOUT the rubber industry the fear of electrostatic fires and explosions has resulted in an appreciable curtailment of production where plant management has maintained traditionally slower processing speeds, tolerated the customary spoilage of costly stocks, and continued ineffectual methods in attempting electrostatic control. From the viewpoint of its hazards static electricity need impose no limitation whatsoever upon the machine speeds employed in rubber processing, no losses of processed stock, and no dissipation of the peace of mind of operators. Experience has shown the chief sources of fires and explosions to be those listed below, roughly in the order of their economic loss:

Post-dip drying
Band building
Bias cutting
Rubber spreading
Cementing operations
Tackifying stock
Calendering
Belt building
Rerolling calendered stock
Tire building
Pre-dip drying
Solvent dispensing
Rubber film manufacturing
Pulverizing and grinding
Dusting calendered stock

In studying any specific problems on mitigating electrostatic hazards, certain technical information is essential in arriving at an adequate solution and in determining by test the important basic criteria which prescribe its factor of safety. These necessary data and criteria are:

(1) Determining all means by which electrification in the stock is produced. A reduction of charge may be accomplished by choosing contacting materials having the same dielectric constant, if feasible. This method has been generally unsuccessful because surface conditions of the contacting substances commonly undergo considerable physical variations from the presence of gaseous, liquid, or solid contaminants.

(2) Measuring resulting voltage and current drain between stock and ground.

(3) Measuring or estimating the electrostatic capacity of the stock, and the energy liberated by a spark from stock to ground. Rubber stock, such as plystock, coated fabric, or gum rubber stock, invariably takes on negative charges in running over metal rollers during processing. As it leaves a grounded roll, the impounded negative charge develops a high voltage with respect to the roll or other grounded objects along its route. Should a spark occur between the rubber stock and a grounded member, complete discharge of large areas of the stock will not occur owing to the relatively high resistivity of rubber. The extent of the discharging area depends largely upon the intervening distance between stock and grounded member. Spark voltage and capacitance of discharged area can be used to calculate the energy of the spark, in order to determine whether this value is above the threshold energy for ignition of any flammable fuel-air mixtures that may be present.

(4) Measuring concentration of fuel-air mixtures throughout cycles of operation, and determining their threshold ignition energy values.

(5) Measuring effectiveness of grounding throughout the stock proc-

(Continued on page 578)

[1]Abstracted from "Electrostatics in the Rubber Industry." R. Beach, "Annual News Letter," Rubber Section, National Safety Council, Nov., 1945.

Plastics Technology

Progress in the Development of Laminates[1]

Harry Kline[2]

THE laminating industry had its inception about 1910 when Dr. Baekeland first introduced phenol formaldehyde plastics commercially. There was a great unfilled demand at that time for a material having good electrical insulating properties, as well as lightness, and good water and chemical resistance. The electrical industry was quick to use these phenolic resins to impregnate paper for the production of solid boards which could be employed to solve insulation problems. Applications for laminates have increased continually year after year, and World War II, of course, was a tremendous stimulus to the laminating industry. These products have served well in almost every mechanism of offense or defense produced for the war effort.

When phenolic plastics are mentioned, most of us immediately think of the many items which are made of phenolic molding powders yet, on a pound basis, almost as much resin goes into laminates as is used in molding powders. In 1944 the United States produced 120 million pounds of phenolic molding materials and 96 million pounds of phenolic laminating varnishes.

The Laminating Process

The process of making laminates appears simple, theoretically, though it can be quite complicated. Fibrous materials, such as paper or canvas, are impregnated with a resin solution. (The resin solution usually contains alcohol as the solvent, although water and other liquids are sometimes employed.) The treated, or impregnated, material is then passed through an oven in order to remove the solvent and to advance further the resin so that it has the correct flow properties when heat and pressure are applied. This drying process is very critical as the resin is thermosetting, and if advanced, or dried too much, it will not flow sufficiently. If it is not dried enough, it will flow excessively and produce a poor laminate. After passing through the drying oven, the impregnated material is wound on a mandrel to be cut into sheets. The sheets are then cured with heat and pressure between stainless steel plates.

Development of Impregnating Equipment

The early treating machines had a means of saturating the fibrous material in the varnish, which was then dried by passing through a closed oven heated by steam coils. The amount of impregnation was controlled mainly by thinning the varnish to the proper consistency. The next ovens developed provided heat by means of ducts through which heated air was blown throughout the entire length of the machine. The paper passed through the center of the oven, and heated air was blown both on the top and the bottom of it. This gave a much more uniform product. In the still later machines, heated air through the ducts was combined with a better and more economical means of controlling resin pick-up. This was accomplished by very accurately machined squeeze rolls. The paper, after passing through the varnish, was subjected to the squeeze rolls, and the resin pick-up was controlled by opening the rolls to the proper point. This resulted in a saving of solvent, as well as, perhaps, a more uniform impregnation from side to side. These machines have been further improved by automatic temperature controls. The present modern machines are 4 feet to 10 feet wide and 60 to 100 feet long. The stock can go through this equipment at a greatly increased speed, as compared to the early machines. There is some development at present in the use of infra-red lamps for heating, and a number of treating machines of this type are now in use. Impregnating machines may be either horizontal or vertical, though most of those now in use are horizontal.

Development of Presses

The early hydraulic presses were much smaller than current models and had one opening. The modern presses may have as many as ten openings and are loaded by elevators placed along side them. The plates may be as large as 6 feet by 8 feet or larger. A pressure of 1,000 p.s.i. can be developed over the entire platen area. A machine of this type represents a large investment. One reason for the interest in low-pressure molding is the very much lower cost of press equipment.

Development of Resins

In the early days of the industry one resin was sufficient to produce the products made at that time. However, as the industry grew, demands required resins having special properties. For example, it was found that laminates were hard to punch with steel dies to produce the intricate shapes desired for insulation. To satisfy this requirement flexible resins were developed which overcame this manufacturing problem. For cold punching still greater flexibility is needed. There are various types of varnishes available for laminates which are to be hot or cold punched. Other varnishes have been developed to provide special mechanical properties suitable for the production of molded automotive timing gears and similar applications.

When the refrigerator industry began using laminated breaker strips, about 1930, it found the odor objectionable. As a result, odorless varnishes were formulated. The need of greater chemical and water resistance also created a demand for special laminating resins. The speed at which certain laminates must be cured caused the development of fast curing varnishes.

You may wonder why all desirable properties cannot be combined in one varnish. This would be ideal. However, the resin chemist has found that in modifying a material to improve it in one respect, he decreases or eliminates other good properties. As an example, in order to produce a very water resistant laminate it is necessary to protect the fibers of the paper or canvas, and a varnish having extreme penetration must be used. This, however, gets into the inner fibers and produces brittleness, causing poor impact strength. To make a flexible or punching grade laminate, it is necessary to add a plasticizer to the resin solution, and this usually slows the cure and gives poorer water resistance.

Raw Materials for Resins

The raw materials most commonly used for phenolic resins are phenol, cresols, xylenols, and formaldehyde. By varying the type of phenolic body, the kind of catalyst, method of reaction, and amount of formaldehyde, thousands of modifications can be made, each of which may be employed in some special application.

In addition to phenolic resins, the laminating industry has used some urea-formaldehyde products where light colors and light proofness are desired. The ureas have now been replaced by melamine-formaldehyde resins for these purposes. The melamine-formaldehyde materials also produce laminates which have greatly improved arc resistance and which were employed in large volume during the war, along with fiber-glass, to produce panel boards for Navy ships.

Phenolic resins, made with furfural, have been used only to a limited extent for the production of laminates, but further developments may be expected in the postwar period.

Resorcinol materials will, undoubtedly, become more widely used. They served very well during the war in the production of resins for the low-temperature bonding of heavy timbers. Their use for laminates is still very limited.

Fillers for Laminates

The strength of laminates is due mainly to the fillers employed. The most generally used fillers are paper, cotton fabrics, asbestos paper, asbestos fabric, and, recently, glass fabric.

Using these fillers and various types of phenolic resins, laminators, in cooperation with the National Electrical Manufacturers Association, have established 12 standard types of laminates known as NEMA Grades. Their properties have been published by the Association to permit the selection of the best laminate for any given purpose.

The papers most commonly incorporated as fillers are Kraft, alpha cellulose, and rag, and are used to produce the NEMA Grades X, XX, XXX, XP, XXP, and XXXP. The first three grades are general-purpose paper laminates. The X Grade, containing less resin, is better mechanically, but poorer in water resistance and electrical properties. The XX has more resin, and the XXX a still greater amount. The P Grades are punching stock laminates and are similar to the X Grades except that they are made with a plasticized varnish.

[1] Paper presented before the Detroit Rubber and Plastics Group, Inc., Detroit, Mich., Oct. 30, 1945.

[2] Manager and technical director, phenolic plastics division, Reichhold Chemicals, Inc.; and national chairman, laminating activities committee, Society of Plastics Engineers.

Various types and weights of cotton duck are used: the coarse materials for high impact strength laminates, NEMA Grade C; and finer woven cloth for Grade L. Where greater water resistance and better insulating properties are desired, the cloth is more thoroughly impregnated, and this operation produced Grades CE and LE.

Where heat resistance is important, asbestos paper is used to produce Grade A and asbestos cloth for Grade AA.

Paper laminates have the highest tensile strengths. Those made of Kraft paper reach 20,000 p.s.i.; while some produced with the newer high strength papers have tested 35,000 p.s.i. Laminates made of paper, however, do not have so good impact strength, especially in the edgewise direction, as those produced with canvas. Canvas laminates are five times as strong in impact strength in the edgewise direction.

Laminates made of paper have the best electrical insulating properties and are not only vastly superior in this respect, but also cost considerably less than those made of canvas. If greater impact strength could be imparted to paper laminates by some property in the paper pulp or the resin, this would be an outstanding improvement. This has been done, but only at the sacrifice of other advantages, such as water resistance.

In addition to these standard grades, laminators offer special grades to satisfy unusual requirements. For instance, there are laminates for alkali resistance; X-Ray work, etc., where high dielectric strength parallel to the lamination is required; those having very high mechanical properties, based on fiber-glass cloth; and wood laminates, known as Compreg, which are made of thin wood veneers. There are also decorative grades, usually made with phenolic fillers and melamine resins for the surface sheets, and black decorative panels which have phenolic resin all the way through.

Many chemists have spent considerable time in trying to produce light-colored phenolic resins which are not affected by light, but this problem has not been solved. Though improvements in light resistance have been obtained, phenolic resins are still not suitable for light grades of decorative laminates.

Paper Plywood Combinations

The properties of paper laminates and plywood complement each other. Paper laminates have smooth surfaces, are good in water and wear resistance and tensile strength, though poor in impact strength; while plywood is poor in water resistance, but is good in impact strength. By combining these materials laminators have created a new product which has the water and wear resistance, tensile strength, and excellent surfaces of paper laminates as well as satisfactory impact strength imparted by plywood. Another development along this line, which has proved successful, is the overlaying of plywood surfaces with impregnated paper of from 0.005-inch to 0.010-inch thick, to increase its water and wear resistance, eliminate surface defects of plywood, and provide a good coating surface. This material is used for box cars, ammunition boxes, etc.

This type of plywood, overlaid with impregnated paper, may be produced with various surface designs and colors and will, undoubtedly, be made available for many applications in the building industry.

Recent Developments

Low-Pressure Molding

Most laminates are molded at pressures of 1,000 p.s.i. and higher. The use of much lower pressures, such as 100 p.s.i. and even less, is not a new idea. It has, however, only recently been commercialized. I produced numerous laminates in 1929 and 1930 with pressures as low as 10 p.s.i. which were the basis for Canadian and British patents. It proved difficult, however, at that time to sell the laminating industry on low-pressure production methods.

The introduction of Mitscherlich high strength papers and the advent of the war gave great impetus to the use of low pressures. Laminates made of these special papers and cured at 100 p.s.i. to 250 p.s.i. have exceptionally high tensile strengths and excellent water resistance. With the advent of war, and the consequent greater demand for laminates, low-pressure presses came into wider usage. This was because they were easier to obtain as they required less critical materials than the large presses. Presses are now available which can produce sheets of eight feet by 16 feet at low pressure. Equipment of this size, capable of curing at higher pressures, would be tremendously expensive.

Special phenolic resins, of a lower molecular structure, have been developed which will flow at pressures as low as 50 p.s.i. These resins make it possible to use fluid pressures, as is done in bag molding, and have opened up a host of new possibilities for molded laminates.

Molded Laminates

Low-pressure laminating has stimulated the search for new techniques of molding laminates in various shapes besides flat sheets. During the war some outstanding achievements were made in this field, employing fluid pressures.

Laminates were, of course, molded into various shapes long before the war. Items such as automotive timing gears have been molded of canvas laminates for a great many years, and large objects, for example, refrigerator door liners, were also molded of laminates just before the war. These products were produced by high pressures, which method is still the best for the mass production of molded laminants. High-pressure molding produces laminates which have definite superiorities, such as better surfaces, more water resistance, and somewhat greater strength. The cost of molds and large hydraulic presses required for high-pressure molding must, of course, be considered. However, where the article is to be produced in large quantities, the initial cost of a mold can easily be absorbed. For instance, where a laminator produces 2,000 refrigerator door liners a day, the cost of the mold becomes a very small part of the price of each door liner.

During the war there was a demand for many new and novel molded parts. In some cases the sizes desired were too large for available presses, as for example, boat hull sections. Other requests covered quantities which were not large enough to warrant the cost of high-pressure molding. Applications of this type can be handled economically by low-pressure molding and especially fluid-pressure molding.

Where dies are used in a hydraulic press, the chief advantage of low-pressure molding is in the lower cost of making the dies, as these can be made of Kirksite or other such alloys. Most low-pressure molding is accomplished, however, by means of some form of the bag molding process.

One method is to use a certain type of hot press. Here the mold is set on a container which can be heated by means of steam or gas. When this container is raised against the press, a rubber diaphragm, a bag which is actuated by water pressure, exerts the fluid pressure against the mold.

There are two other procedures commonly employed, and these involve the use of autoclaves. In one method a female mold made of steel or other material is used, and the impregnated material is placed into the mold. Next, a sheet of cellophane is inserted to prevent sticking. A rubber blanket is then clamped around the mold, and vacuum is applied which presses the blanket against the impregnated material. The entire assembly is then placed into an autoclave, and steam or air pressure and steam are applied to the extent of about 50 to 100 pounds. When the vacuum is released, the volatile matter escapes.

In the other method a male mold is prepared from wood or other material. The impregnated material is then laid over the male mold, and the entire assembly is enclosed in a rubber bag which has an opening for the application of a vacuum. The entire bag is then placed into an autoclave, and heat and pressure are applied as explained in the previous process.

These newer methods are used primarily for large pieces or where only a small number of products are desired.

Another war development is the use of only contact pressure in the molding of laminates. This usually refers to molding where pressures of only one pound to 15 pounds are required. These pressures are obtained by merely evacuating the rubber blanket which surrounds the material. The entire assembly is then placed into an oven to be heated in order to cure the material. While phenolic resins have been developed for contact laminates, the most commonly used ones are the allyl resins and the alkyd-styrene combinations.

Post-Forming Laminates

We have been told for many years that, as regards thermosetting phenolic resins, "heat softens them and further heat hardens them, after which still more heat will not soften them." Were this absolutely true, post-forming of laminates would not be possible. This is not entirely true. W. I. Beach, of North American Aviation, Inc., found that when he took a standard piece of fully cured canvas laminate and reheated it and applied a pressure, the piece could be formed or stretched just like metal.

The usual procedure, in post-forming, is to obtain canvas laminate made with a standard phenolic resin or one modified to work best in this process. This is then heated in a gas or infra-red oven, or sometimes on a hot plate, to a temperature slightly above that used in curing the laminate. (Temperatures of 350 to 400° F. are commonly em-

ployed.) The sheet must not be heated too high or it will blister, and if not heated sufficiently, optimum forming properties will not be obtained. (A little experience determines the correct heating time.) The heated sheet is then quickly placed over the forming die, and pressures of 10 p.s.i. to 100 p.s.i. are applied. The mold can be made of inexpensive material, such as hardwood, Masonite, plastics, or metal. The mold cost is not high, and the process has great possibilities of being adapted for many applications. It may, however, encounter certain limitations due to the greater cost of cloth laminates. Paper laminates so far have not proved successful for post-forming. There is a possibility that some of the two-way stretch papers may prove suitable to some extent.

Developments in Resins

In manufacturing phenolic resins the tendency has been to develop materials which cure rapidly. Resins of this type, used during the war, cured articles such as helmet liners in two to three minutes. These fast curing resins are of importance where molded articles are made in large volume, as any reduction in curing cycle results in less molds being needed to attain a given output.

Resins of this kind are now being used for large molded objects like refrigerator door liners; the curing time is three minutes. Resins which not only cure fast, but which impart good water resistance to laminates, made with only 25 to 35% resin, and which are also odorless, are now being commercially used.

Another important development has been the improvement of low-pressure phenolic resins.

Resorcinol resins, while made extensively for wood bonding, have as yet not been used to any extent for laminates.

Melamine resins for arc-resistant laminates and decorative laminates have also been improved.

Alkyd-styrene types of resins, combined with glass fiber as well as cloth, etc., have also attained some importance lately.

It may readily be seen that the laminating industry, with so much recent progress, can be depended upon to contribute its share to the vast number of new and improved products we have all been told to expect.

Chicago Plastics Meeting

THE Low Pressure Industries Division of The Society of the Plastics Industry, Inc., will hold a two-day meeting at the Edgewater Beach Hotel in Chicago, Ill., February 1 and 2. This meeting will feature a product display and opportunities for conferences by specific groups on subjects of particular interest to them. The meeting will be staged under the general chairmanship of J. E. Stokes, of the Bakelite Corp., and Robert J. Brinkema, of Egmont Arens, will head the display arrangement committee.

Prominent speakers who will address the industry members at the meeting include William I. Beach, 1944 winner of the John Wesley Hyatt Award, who will talk on "Post Forming Developments during the War and Their Application to Peacetime Products." John D. Lincoln, of Virginia-Lane Corp., is scheduled to discuss "Low Pressure Molding during the War and Its Possibilities in the Future." Topic of Herbert L. Stone, editor of *Yachting*, will be "The Future of Plastics in Boat Building." "Present Products of the Low Pressure Industry" will be the subject of an address by William J. Connelly, of Bakelite. Egmont Arens, well-known industrial designer, will speak on "Future Trends in the Low Pressure Field."

Of particular value will be the series of conferences being planned. These will include meetings with resin manufacturers, machinery makers, designers, and others, at which industry members will be able to obtain first-hand information on their problems.

Vinyl Resin Stabilizer

ADVANCE SOLVENTS & CHEMICAL CORP., 245 Fifth Ave., New York 16, N. Y., has developed a Stabilizer V-1-N to prevent the discoloration and chemical breakdown of polyvinyl chloride and vinyl chloride-acetate copolymers when the resins are processed at high temperatures and exposed to light. This stabilizer has a very pale straw color, a ketone ordor, a specific gravity of 1.03, a Gardner-Holt viscosity of less than A, and weighs 8.58 pounds per gallon. Being a fluid, Stabilizer V-1-N can be readily incorporated in vinyl resins being worked on a mill or in a Banbury. It is also compatible and soluble in vinyl resin solutions and can be used in lacquers based on such resins. Use of this stabilizer permits the milling and calendering of vinyl resins at high temperatures without decomposition of the resin or loss of transparency in resultant films. The transparency of the film will depend on film thickness and concentration of Stabilizer V-1-N. For 0.005-inch thick films, use of 2-3% of the stabilizer is suggested.

CALENDAR

Jan. 4.	Philadelphia Rubber Group. Benjamin Franklin Hotel, Philadelphia, Pa.
Jan. 7-11.	Society of Plastics Engineers. All Plastics Exhibit. Convention Hall, Atlantic City, N. J.
Jan. 12.	United States Golf Association. Annual Meeting. Waldorf-Astoria Hotel, New York, N. Y.
Jan. 22-24.	Bicycle Institute of America, Inc. Annual Meeting. Hotel Commodore, New York, N. Y.
Jan. 24.	Ontario Rubber Section. University of Toronto, Toronto, Ont., Canada.
Jan. 24-26.	The American Physical Society. Annual Meeting. Columbia University, New York, N. Y.
Jan. 25.	Chicago Rubber Group. Hotel Morrison, Chicago, Ill.
Feb. 1-2.	Low-Pressure Industries Division, Society of Plastics Industry, Inc. Edgewater Beach Hotel, Chicago, Ill.
Feb. 3-8.	National Sporting Goods Association. 1946 Convention. Hotel New Yorker, New York, N. Y.
Feb. 5.	Los Angeles Rubber Group, Inc. Mayfair Hotel, Los Angeles, Calif.
Feb. 25-Mar. 1.	A.S.T.M. Spring Meeting. Pittsburgh, Pa.
Feb. 25-Mar. 2.	Twentieth Exposition of Chemical Industries. Grand Central Palace, New York, N. Y.
Mar. 5	Los Angeles Rubber Group, Inc. Mayfair Hotel, Los Angeles, Calif.
Mar. 16-24.	Fourth Annual Southwest Sportsmen's Show. Municipal Auditorium, St. Louis, Mo.
Mar. 20-22.	Chicago Technical Societies Council. Chicago Production Show and Fourth Annual Conference. Stevens Hotel, Chicago, Ill.
Apr. 2-5.	Packaging Exposition. Public Auditorium, Atlantic City, N. J.
Apr. 8-12.	American Chemical Society. Atlantic City, N. J.
Apr. 27-May 18.	International Products of Tomorrow Exposition. Chicago Coliseum, Chicago, Ill.

Phosphorescent Lustron

A NEW series of Lustron phosphorescent molding compounds with greatly increased after-glow effect has been announced by the plastics division of Monsanto Chemical Co. at Springfield, Mass. An outgrowth of extensive wartime research, these polystyrene materials of the Lustron 1200 series have an after-glow potency more than double that of any prewar phosphorescent thermoplastic. Molded parts from these materials glow visibly for six or eight hours and also show some fluorescence when illuminated by black light or other sources. Subject to the same supply restrictions as applied to other thermoplastic molding materials, the Lustron 1200 series are available in phosphorescent colors of green, green-blue, blue, and bright blue. Daylight colors range from green to gray, but may be made in a still broader range. The new materials are expected to find use in switch plates, clocks, instrument dials, auto and aviation dashboard, light pulls, street markers, and door numbers.

New S.P.E. Test Methods

THE Society of Plastics Engineers, Inc., through its laminating activities committee, has issued two new test methods: "S.P.E.-100-M Test for Determination of Volatile Contents of Laminating Materials," and "S.P.E.-101-M Test for Determination of Flow Properties of Laminating Materials." Tentative drafts of these test methods were submitted to industry by the committee, together with a series of questions. The tentative test procedures were revised to conform with the composite thoughts of the industry, as expressed in the answers to the questionnaires, and issued in their present form.

Volatile contents are determined in S.P.E.-100-M by calculation from the change in weight of a test specimen when heated at 160° C. for 10 minutes in a convection-type electric oven under carefully specified conditions. Method S.P.E.-101-M determines flow properties from the change in weight of samples during specified curing cycles.

RUBBER WORLD NEWS of the MONTH

Highlights—

Year-end statements by industry executives were generally optimistic for a high level of industrial activity during 1946 although P. W. Litchfield, of Goodyear, called attention to the fact that unless a much higher degree of domestic unity begins to take form soon, the outlook for 1946 is not too encouraging. Pessimism regarding the procurement of natural rubber from the Far East featured the London rubber parley. Public hearings by the Inter-Agency Policy Committee on Rubber were to be held in Washington early in January. Rubber Reserve closed down three high-cost alcohol butadiene and three high-cost petroleum butadiene plants during December. All tire rationing ended on December 31, but the necessity of continued tire conservation was strongly emphasized by the RMA. NLRB strike votes by the employes of major rubber companies were in favor of strike action, but actual strikes seemed one or two months off and dependent on the outcome of the General Motors dispute.

The Outlook for 1946

As the year 1945 drew to a close, year-end statements by rubber company heads were moderately optimistic for industrial activity during 1946. The meeting of the international Rubber Study Groups in London during November ended with a note of pessimism regarding the procurement of natural rubber from the Far East during the coming year. Public hearings by the Inter-Agency Policy Committee on Rubber were scheduled for January 8, 9, and 10 in Washington, D. C., in order to make sure that all interested groups have ample opportunity to be heard on the important question of what is to be our national policy on rubber. The Office of Rubber Reserve closed down three high-cost alcohol process butadiene plants and three high-cost petroleum process butadiene plants during December. It was announced on December 20 by the OPA that all tire rationing would end December 31.

Executives' Year-End Statements

In his year-end statement, **Herbert E. Smith,** president of the United States Rubber Co., pointed out that the rubber industry is expected to produce goods in 1946 with a value of $1,500,000,000, an increase of 66% over the $900,000,000 in 1939, the last wholly peacetime production year. The major part of this record production will be accounted for by tires, it was said. Operating at capacity, the industry is expected to produce more than 80,000,000 units, of which 66,000,000 will be passenger-car tires. Previous largest passenger-car tire output was 50,000,000 in 1941. Achievement of the 66,000,000 goal of 1946, which is at a rate of more than two tires a second, will ease the tire shortage, but not noticeably until the latter part of the year.

Other goods, such as footwear, golf balls, drug sundries, etc., will also be scarce in the early part of 1946, but with the industry geared for capacity output, supplies will greatly increase as the year progresses.

Total consumption of rubber by the United States in 1946 is estimated as 900,000 tons, which compares with the previous high of 780,000 tons in 1941 and an average of 540,000 tons in prewar years. Of the 900,000 tons, approximately one-third may be natural rubber, and the remainder various kinds of synthetic rubbers. World consumption of all types of rubber for 1946 is placed at 1,400,000 tons. The year's potential world production of all such rubbers is estimated at 1,900,000 tons, of which 1,200,000 is the synthetic capacity in the United States, Mr. Smith said.

John L. Collyer, president of The B. F. Goodrich Co., in his year-end statement reported that the year 1946 for America's rubber industry will be largely devoted to catching up on long-deferred and urgent demands for civilian products. Meanwhile the industry will be developing the postwar potentialities of new materials to assure maximum service and lowest cost to users of all types of rubber products.

Mr. Collyer gave the same figure and the same breakdown for United States rubber consumption during 1946, as Mr. Smith, i.e., 900,000 tons. He stated that estimates indicate that we cannot count on receiving more than 300,000 tons of natural rubber during 1946.

"During 1947, though, we should be very close to, or into, the period of out-and-out competition between natural and synthetic rubber. It is, of course, impossible to forecast accurately what the exact performance-price balance between these materials will be when that time is reached. Technical progress in the manufacture and use of synthetic rubber will, I am confident, continue," stated Mr. Collyer.

"A brief look at the rubber record for 1945 accents the extraordinary success that American scientists and engineers had in making synthetic rubber do almost everything that rubber had to do in helping win the war. So thoroughly did synthetic take the place of natural that by September, 1945, it was necessary to use but 5,787 tons of natural rubber in that month—only about 11% of the total.

"Although there has been much discussion of spectacular postwar products stemming from the lessons learned in synthetic rubber, it is not anticipated that any of these will reach sufficient volume in 1946—mainly because equipment for manufacturing them is not available—to alter markedly the general pattern of the industry in terms of relative tonnages going into various classes of products. That is, automobile tires and tubes are expected to account for their historic share of approximately 70% of the total volume, with industrial rubber products, footwear, wire and cable insulation and drug sundries following in about that order to make up the bulk of the remaining 30%.

"However, toward the end of the year and surely in 1947, several classes of products whose potentialities were brought forth during the war will come into increasing production and use," Mr. Collyer declared. "Outstanding among these are rubber spring suspensions—such as the Torsilastic spring used during the war on 20-ton track-laying military vehicles, which are now being installed on advanced-design intercity buses—foamed latex (especially if natural rubber latex is available at low prices), various types of vibration dampeners and sound insulators, and rubber used in protecting films and coatings, and in combination with non-rubber plastics of several types."

Mr. Collyer concluded his statement with a plea for a military-security minimum production of synthetic rubber of 200,000 tons and a recommendation that beyond that figure the free play of economic forces should determine the relative uses of natural and the synthetic products so as to assure the full benefit of lowest cost and greatest service to the consumer.

P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., in his statement emphasized that as a nation we look back upon a year of historic accomplishment in the conclusive defeat of the Axis powers, but added that we paid the price of victory in the lives of 250,000 of our young men and in the maimed bodies of hundreds of thousands more. We paid in terms of stupendous destruction of our materials and in the accumulation of a debt load which fixes new burdens on our basic economy. Every American citizen, directly or indirectly, is and will continue to be affected by the price of this global war.

"In winning, we preserved the independence of America and insured our freedom to go forward as individuals and as a nation," Mr. Litchfield said. "Our land was spared the devastation of invasion and bombing. We established ourselves as the strongest force in world affairs and as the nation to whom much of the world will look for leadership.

"Under these conditions America might well look forward to a fruitful period through the concentration of her vast energies upon needed production. There is a great market awaiting us for the products of our energy and resourcefulness. Along with this there is a deep-seated longing for peace and all that goes with it as contrasted with the bitterness of war. We could be busier than we have ever been and more people could have more of the useful products of such activity. We have much lost time to make up.

"Unfortunately but undeniably, however, these opportunities and the realization of our natural longings for peaceful progress seem to be slipping away from us as domestic strife grows," Mr. Litchfield pointed out. "Needed products are not being made, individual and corporate earnings are being sacrificed, and the seeds of discord are

sprouting in alarming fashion. Thus the immediate future is neither clear nor bright.

"Accurate forecasting of business and employment is made impossible by the wave of strikes and fomented unrest. The paradox is that while almost everyone recognizes the nature of our problems, effective steps are not being taken on a national scale to meet them.

"In 1946 we have two choices: we may go forward or we may drift into dangerous conditions. If the Americans who worked together so magnificently in the winning of the war can reunite for the peace, all will be well. But unless a much higher degree of domestic unity begins to take form soon, the outlook for 1946 is not at all encouraging," Mr. Litchfield said in conclusion.

The rubber industry, having completed its reconversion task, should hit peak production by mid-March, according to **John W. Thomas,** chairman of the board of the Firestone Tire & Rubber Co., in his year-end statement. Manufacture of passenger and truck tires, barring unforeseen difficulties, will reach an all-time high during 1946. The goal for the industry, during one full year of peak production, is 94,000,000, which is 24,000,000 units above what the industry would figure as a normal demand had it not been for the replacement backlog built up during the war years. The new year will find tire dealers with uncomfortably small inventories, a fact which may delay deliveries to consumers in many parts of the country.

"The synthetic passenger-car tire available today is as good as the prewar natural rubber tire. Just when we again will receive large shipments of natural rubber depends upon the rapidity with which Far Eastern rubber growing areas are brought into bearing," Mr. Thomas said. "Because of disturbed political conditions, dislocation of labor, severe shortages of equipment, food and other consumer goods, and a disrupted transportation system, the future rate of production must remain in question for some time. It is fortunate that Firestone's Liberian plantations have been able to consistently increase production, furnishing a goodly portion of the natural rubber received in the United States throughout the war years, and remaining still an important source of supply," he added.

"The United States learned two valuable lessons during the war—lessons that will bring two-fold benefits to our rubber-wheeled economy. One was the importance of growing our own natural rubber, a goal set by Harvey S. Firestone, the founder of our company; and the other, the ability to manufacture a synthetic rubber, which in some products performs better than natural rubber. Knowledge of synthetic rubber manufacture has armed us against future loss of supply of this vital material in a national emergency and at the same time, should prevent wide fluctuations in the price.

"Management and labor will have to display a reasonable attitude in their common problems and, naturally, the government will have to use great skill in its timing of a proper removal of price controls, and in its adjustment of the delicate economic mechanism," Mr. Thomas concluded.

A. L. Viles, president of The Rubber Manufacturers Association, Inc., in a survey of the year ahead, reported that measured against prewar consumption and even greater postwar requirements, 1946 will continue to be a "famine year" as far as natural rubber is concerned. He based his appraisal on the latest reports from the major rubber producing areas and to it he coupled a warning that most sections of the world market will suffer acute shortages of finished rubber products for many months to come—probably into 1947.

"The picture is much brighter in this country," he said, "both as to raw materials and the finished products. Thanks to the availability in good supply of high-quality synthetic rubbers, American manufacturers will reduce substantially the backlog of consumer demand that accumulated during the war years.

"Trade circles expect an all-time peacetime record consumption of approximately 900,000 tons of rubber in this country in 1946. In light of difficult production problems in the troubled Far East, natural rubber producers may be unable to meet more than a third of this demand. Best current estimates are that natural rubber receipts in this country will run between 250,000 and 350,000 tons.

"Relatively low-cost, petroleum-base synthetic rubber plants with a proven capacity of between 500,000 and 600,000 tons of GR-S are currently operating. To this can be added estimated output of 70,000 tons of GR-I, Butyl, and 30,000 tons of GR-M, neoprene.

With the natural rubber continuing in tight supply throughout 1946, no wholesale conversions from synthetic rubbers are indicated. Receipts of even as much as 350,000 tons of natural rubber would actually be less than our manufacturers consumed in the critical war year of 1942, it was said. However, war requirements have diminished to the extent that the Civilian Production Adminsitration estimates that expected natural rubber receipts may permit an average conversion of up to 70% synthetic rubber and 30% natural rubber sometime in 1946.

"Such a balance of rubber stocks will assure the consumers of this country ample supplies of most rubber goods by the latter part of the year, although fully normal stocks of tires may be as far away as early 1947," Mr. Viles pointed out.

"In such balance, manufacturers will be able to supply a wide range of products that will be superior in quality to corresponding merchandise in 1941, items that will match or out-perform prewar goods straight across the board —in passenger-car tires, rubber heels, insulating materials, many rubber sundries, certain hard rubber products and mechanical goods, and hundreds of other rubber items," Mr. Viles concluded.

A supplement to the RMA survey, issued about ten days after announcement of the lifting of tire rationing on December 20, emphasized that the end of rationing had practically started a stampede.

"The tire stampede is on," the statement attributed to Mr. Viles said. "The lifting of tire rationing has brought down upon the rubber manufacturing industry a virtual avalanche of consumer demands for new tires. Millions of motorists who are counting on tires in January are going to be disappointed.

"In light of the tremendous demand that has been built up in the past few days through tens of thousands of tire dealer outlets in the nation, we feel that we cannot state too strongly our belief that the scarcity of passenger-car tires will continue extremely acute throughout 1946. We feel that motorists must be discouraged in the strongest terms from the indiscriminate buying of tires where they are not absolutely necessary. Tire conservation will remain in order for many months."

The RMA review of the year 1945 mentioned the record-breaking production of military tires by the rubber manufacturing industry and the fact that rubber heel and sole manufacturers had been handed the job of putting the Armed Forces of this country entirely on rubber heels and soles for the first time in history. Manufacturers of coated materials had concentrated on war orders which by the first of 1945 required enough yards of coated fabrics to spread from New York to Tokyo five times, and the mechanical goods and hard rubber branches of the industry were likewise at peak production for war and industry use. Makers of rubber druggists' sundries broke all existing production records in serving the health requirements of both the Armed Forces and the public.

"Having staked permanently its claim to a place in the world of basic raw materials, the question rose in international discussions as to where the balance may fall between man-made rubber and tree rubber when the great plantations of the Far East again come into full production," Mr. Viles said. "That question—tied to such complex considerations as price, labor supply and transportation—is being studied constantly in government and industry circles. However, the British, Dutch and American Rubber Study Group had before it a suggestion of a prospective world capacity at some future date of 2,400,000 tons of natural and synthetic rubber as against a total estimated world consumption of around 1,500,000 tons. But estimates predicated on such a surplus may not assume definite shape to the extent of becoming a major economic problem for several years, if at all, because of the known backlog of civilian demand throughout the world coupled with the tremendous effort necessary for the rehabilitation of the plantations regained from the Japanese—plus the long period of time that may be required for that operation.

"While American-made synthetic rubbers demonstrated their superiority to natural rubber in many uses during 1945, there are still differences of opinion with respect to its performance in many others. Day to day revisions of opinion were the rule in 1945 as new advances were made in chemistry, compounding and the overall technology of synthetic rubber," it was said. "Great improvements grew out of intensive wartime research. Further improvements in the quality and usefulness of the polymer appear likely, and new synthetic rubber polymers will make their bow in the year ahead.

"On the technological side, 1945 brought many important developments in the rubber industry. Among these were the advances made in the electronic curing of rubber products. Already applied successfully to certain types of rubber goods, there is every

indication that electronics will be even more widely used in the months to come. Other advances have been made in machinery, notably in the development of the so-called robot tire-making machine which greatly increases output."

The London Rubber Conference

The following report on the meeting of the Rubber Study Group was released simultaneously in London and Washington, on November 24:

"The second meeting of the Rubber Study Group which was established in 1944 by the Governments of the Netherlands, the United Kingdom and the United States to discuss common problems arising from the production, manufacture and use of rubber took place in London between November 19 and 23 inclusive. As announced on November 19, France has joined the Group. George Archer, Under Secretary of the Raw Materials Department, Ministry of Supply, presided over the meeting. Donald D. Kennedy, chief of the International Resources Division, Department of State, the leader of the U. S. group, acted as vice chairman. The French delegation was led by M. Peter, Director for Economic Affairs, Colonial Ministry, and the Netherlands delegation by Mr. Westermann, Trade Commissioner for the Netherlands Indies in London.

"Further studies of the prospective world rubber situation were presented to the Group on behalf of the participating Governments. These included the latest information on the United States' synthetic industry and such reports as have become available on conditions in the Far East since the liberation of the rubber producing areas.

"United States' capacity for the production of general and special-purpose synthetic rubber is now about 1,055,000 tons per annum, and total world capacity may be estimated at 1,300,000 to 1,400,000 tons. Preliminary reports from Indo-China indicate that there has been no damage to trees on rubber estates and that in Malaya not more than 10% of the trees have been destroyed during the Japanese occupation. No reliable information is as yet available from the Netherlands Indies. Discussions took place on measures being taken to rehabilitate the natural rubber producing areas. In view of the disturbed political conditions, the severe shortage of labor, equipment, food and other consumer goods and the disrupted transportation system which will require extensive repair and reequipment, any figure of the future rate of production must remain conjectural for some time to come. Stocks in various parts of the Far East at the time of the liberation were estimated to be from 200,000 to 300,000 tons, but it is not known how much of these will actually be assembled and shipped. The Group, while emphasizing the tentative nature of any conclusions, suggests that supplies of natural rubber becoming available in manufacturing countries from all areas of the world including the Far East during 1946 might reach approximately 600,000 tons.

"Looking to a longer period the Group saw no reason to modify the conclusion reached at its first meeting, namely, that 'Actual production, if required of the natural rubber areas of the world, could rise in three to four years to an annual figure in the neighborhood of 1,500,000 tons of rubber.' This gives a total world potential capacity of natural and synthetic of about 2.1 to 2.8 million tons though it should be stressed that actual production will probably not approach such figures.

"The estimate made at the first meeting of the amount of rubber likely to be processed and consumed in the next few years put the figure at a maximum of 1,500,000 tons annually of all types of natural and synthetic rubber. The Group after full consideration felt that this remained a reasonable estimate. As previously stated, this estimate depends on the maintenance of a high level of economic activity in consuming countries, but assumes that there will be no sudden large development of the uses of rubber. The long term trend of consumption is expected to continue upwards.

"The disequilibrium between the productive capacity of the world and its demands for consumption which was foreseen at the first meeting is therefore still contemplated by the Group as a possibility in the course of two or three years. Discussions at the Group meetings suggest that there will be a range of uses for which natural rubber may be better suited than synthetic and another range in which synthetic may be preferable to natural. Between these, however, there may well be a large area in which satisfactory results may be expected from either form of rubber and where manufacturers are likely to be guided in their preference by the relative costs of the raw materials of processing and the performance of the end products.

"As regards costs, information discussed at the Group meetings showed that plant manufacturing costs in the U. S. A. have declined markedly in the recent past and are more than covered by the present selling price of 18½ U. S. cents per pound for general-purpose synthetic. Indications were given that the trend of production costs is still downward.

"It was considered that the uncertainties of the situation in the Far East made it impossible to reach any conclusions about probable costs of production of natural rubber in normal conditions.

"The terms of reference of the Group provide that other interested Governments shall be kept informed of its work and steps will be taken to this end.

"It is hoped to arrange a further meeting of the Group as soon as more adequate information is available of developments in the rubber producing areas."

Information from other sources stated that pessimism regarding natural rubber procurement from the Far East during 1946 was very much evident at the London conference. The Dutch were reported to expect just as much or more trouble from the natives in Sumatra as they are having at present in Java. They believe it will require an army of 70,000 men to control the Netherlands India areas, and such an army will not be available until late Spring of 1946. The logistics of maintenance and supply of this army in the Netherlands-India will be most difficult, and it all adds up to a considerable delay in natural rubber procurement from that area. It is understood that the Dutch have assembled a large amount of supplies in Australia for the rehabilitation of their rubber estates; while the British as yet do not have a very great volume of supplies in the Far East. The labor supply in Malaya was reported to be only about 30% of that required to get the British-owned rubber estates producing again.

Other Reports on Far East Rubber

An account in the *Akron Beacon Journal* for December 10, attributed to H. L. Riddle, assistant comptroller of the Goodyear company, who had just returned from the Netherlands India, also stated that native unrest in that area is going to hold up rubber production for months. Americans and Europeans are not permitted on any of the rubber estates, but Mr. Riddle learned that on Sumatra, Goodyear's 16,000-acre Dolok Merangir plantation was in the hands of a Filipino and two Chinese. Five thousand acres, approximately 500,000 rubber trees, were cut down during the war to make room for raising food.

"The only report we obtained from the Wingfoot estate which has 38,000 acres is that it was in good shape until the Japanese left," Mr. Riddle said.

Goodyear's Java plant at Buitenzorg has been looted two or three times and will have to be completely rehabilitated before it can be put in operation again.

"They have thousands of tons of rubber in stockpiles, but no one is buying it because you don't know who really owns it," Mr. Riddle explained.

An Associated Press report from Singapore dated December 12 quoted members of the Singapore Advisory Council as declaring that Malayan estates were ready to supply rubber to the United States and the rest of the world as soon as a decision can be made on setting up foreign exchange facilities.

The first vessel carrying a load of crude rubber from the Far East since early 1942 docked at New York during the Christmas holidays. It was the *Canton Victory* with 8,100 tons of rubber from Batavia, Singapore, Penang, and Port Swettenham, ports that had been inaccessible for more than three years because of the Japanese. According to a RFC spokesman and a representative of the rubber industry, such shipments of crude rubber will be divided by a raw materials board which will include delegates from the United States, Great Britain, Russia, France, China, and the Netherlands. The RFC spokesman was reported to have expressed the opinion that most of the rubber brought here would remain in the United States because we were best equipped to use the material to advantage along with synthetic rubber. The cargo of 16,200,000 pounds was said to have cost the United States Government $6,000,000, or about 37c a pound.

Public Hearings on Rubber Policy

Public hearings on rubber requirements and supply, production costs of natural and synthetic rubber, and related subjects were scheduled for January 8, 9, and 10, at the Social Security Building Washington, D. C., by the Inter-Agency Committee on Rubber, according to an announcement made by William L. Batt, chairman of the Committee, on December 11. The Committee has already consulted numerous individuals informally, Mr. Batt said, but wishes to make sure that all interested groups have ample opportunity to be heard.

Persons desiring to be heard or to file briefs with the Committee must confine themselves to subjects pertinent to the functions of the Committee, which are: (1) to obtain and assemble pertinent statistical, technical, and economic information on short- and long-term rubber requirements and supply, production costs of synthetic rubber and related subjects; (2) to survey plans and programs of government agencies for the maintenance of a synthetic rubber industry; maintenance of stand-by rubber plants and disposal of surplus plants; encouragement of rubber research and development; establishment of a strategic stockpile of rubber, development of wild and cultivated natural rubber in the Western Hemisphere; and establishment and maintenance of a mutually advantageous program for importing natural rubber from the Far East.

After hearings are concluded, the committee will report to the Director of War Mobilization and Reconversion on the nature, adequacy, and consistency of proposed programs and will submit recommendations to him on matters requiring action by the OWMR, the President, or Congress.

It is believed that in addition to these scheduled hearings, a considerable time will be spent by Congress in hearing testimony on the subject of our national rubber policy after the recommendations of the Committee are presented for legislative action.

Howard S. Piquet, Room 4737, Social Security Building, Washington, D. C., is executive secretary of the Committee.

RFC Closes High-Cost Plants

The RFC, through its Office of Rubber Reserve, on December 4, announced the closing of three high-cost alcohol process butadiene plants and three of the high-cost petroleum process butadiene plants. The three alcohol plants were those operated by Carbide & Carbon Chemical Co. at Louisville, Ky., and Institute, W. Va., and the plant operated by Koppers Co., Inc., at Kobuta, Pa. They have a combined rated production capacity of 220,000 tons of butadiene a year. The three petroleum plants are small refinery conversions and have a combined rated capacity of 14,000 tons a year. They are the plants operated by the Humble Oil & Refinery Co., Ingleside, Tex., Lion Oil Refinery Co., El Dorado, Ark., and Taylor Refining Co., Corpus Christi, Tex.

J. D. Hadlock, associate director of the Office of Rubber Reserve, said the two principal reasons for the closings are the return of natural rubber from the Far East which, he said, is expected to become an "even flow" by mid-1946, and the accumulation of a GR-S inventory of 150,000 tons, held both by the rubber industry and the ORR. Each of the six plants will be kept in standby condition and can be put back into production if necessary in from 30 to 90 days, Mr. Hadlock explained.

The cost of butadiene during 1945 was about 40c a pound from alcohol, compared with 8c to 10c a pound from petroleum, Mr. Hadlock said. This made the cost of alcohol GR-S about 24½c a pound, as compared with 12 or 13c rubber from the petroleum plants.

"We have a directive from the Office of Reconversion telling us to run synthetic rubber production on an 'efficient and economical basis in the best interests of the Government.' We construe that to mean that we run it on a business-like basis," Mr. Hadlock stated.

The cumulative production costs through July, 1945, for each of the three petroleum process plants being closed were: Lion, 25c a pound; Taylor, 37c; and Humble, 28.2c a pound.

RFC Plant Disposals

The RFC on December 10 announced that the heavy-duty tire plant, capacity 1,500 tires a day, formerly operated by Goodyear and located at Topeka, Kan., was offered for sale or lease. The plant is completely equipped with the latest-type production machinery, including Banbury mixers, vulcanizers, and mills. RFC is the agency designated by the Surplus Property Administration to dispose of the property in the interest of continued employment, it was said.

It was also reported on December 15 that RFC had sold or leased seven other plants built by the government during the war and operated by various rubber companies. Sale of the plant at Tuscumbia, Ala., which was to have been operated by Robbins Tire & Rubber Co. for the government, was made to that company for the same price as the cost of the plant, $998,000. The $500,000 plant at Wadsworth, O., which was to have been operated by the Bearfoot Sole Co., was in the process of being sold to the company for $420,000. Another listed but incomplete sales transaction concerned the U. S. Rubber plant at Scottsville, Va., which cost $2,202,186 and was to be sold to the company for $1,837,500. Tentative sales approval has also been given the General Tire & Rubber Co. for the $447,290 tire plant which it was to operate at Waco, Tex. General has received at the same time tentative approval for leasing another part of the Waco plant, which the company had planned to operate for the government and which is valued at $576,000. Included also was a government-owned tire plant at Natchez, Miss., scheduled for sale to the Armstrong Tire & Rubber Co. for $1,050,000. The sale of the tire plant at Topeka, Kan., mentioned above, was tentatively approved with the Goodyear Tire & Rubber Co. to pay $7,961,533 for this plant.

Plants leased as of November 30, 1945, were a tire plant at Oakland, Calif., to Pacific Rubber & Tire Co. for five years, valued at $1,400,000; a tire plant at Des Moines, Iowa, to Lake Shore Tire & Rubber Co., for five years, valued at $3,300,000; and a tire plant at Pottstown, Pa., to Firestone Tire & Rubber Co., valued at $8,143,324. United Carbon Co. has leased a carbon black plant at Odessa, Tex., valued at $8,978,458; Continental Carbon Co., at Sunray, Tex., valued at $2,240,000; and Panhandle Carbon Co., at Eunice, N. M., valued at $2,750,000.

Tire Rationing Ends

All tires will be released from rationing at midnight December 31, 1945, OPA Administrator Chester Bowles announced on December 20. Mr. Bowles said that the decision to end rationing is in line with the agency's general policy of lifting rationing controls on any commodity when supply becomes sufficient to overcome any danger of general hardship. This point has been reached in tire production.

J. D. Small, CPA Administrator, assured Mr. Bowles in a letter recommending the ending of tire rationing, that increased production warrants the action. Mr. Small's letter said, in part:

"This recommendation is based on the most recent figures on tire production and the availability of tires for civilian use as furnished me by our Rubber Division. In making this recommendation, the CPA knows that the pent-up demand developed during the war years will not be fully met on January 1, 1946. On the other hand, it is the considered opinion that tire production has reached a level sufficient to obviate a transportation breakdown. The following table indicates the recent rise in tire production:

	July 1945	October 1945	December 1945
Passenger Car Tires	1,945,223	3,652,400	4,000,000*
Truck and Bus Tires	1,115,510	1,080,879	1,122,000*

* Estimated.

"The situation in truck and bus tires is somewhat better than in passenger-car tires, but tires for these uses also will not be plentiful even though there are twice as many for civilian use—replacement and original equipment—than were available before VJ Day. Futhermore, the table shows a much improved supply position in civilian truck and bus tires:

AVAILABILITY FOR CIVILIAN USE
(Replacement and Original Equipment)

	July 1945	December 1945	Percentage Increase
Truck and Bus Tires	454,417	1,082,000	138%

"In order to increase further the number of tires available to rolling wheels in the immediate future, several restrictions will remain in force. White sidewall tires will continue on the prohibited list. Tires for export will be continued on a quota basis. No spare tire for original equipment means that more tires will be available promptly for replacement use, provided dealers and drivers cooperate in seeing that tires go on the wheels which need them most.

"As mentioned above, a plentiful supply of tires is not in sight for several months, perhaps for all of 1946. However, during the war, drivers have learned many conservation measures that have added thousands of miles to existing tires on the road. Recapping facilities have been increased tremendously and there is today a much improved knowledge of tire repairing. I suggest that all drivers be urged to continue the care and conservation measures that have helped immeasurably to prevent transportation breakdowns during the past four years.

"The CPA's rubber control order R-1 is in the process of revision and is expected to be reissued in amended form on or before December 31, 1945, so that there will be a formal order by which remaining controls may be enforced."

Mr. Bowles in his statement said that it was believed that dealers recognize the problem created by the comparatively short supply and that they will do everything possible to take care of hardship cases and to distribute the tires they receive to a maximum number of motorists. He urges dealers to do this and not to sell complete sets of tires to those who can get along with one or two during the next several months.

ESTIMATED AUTOMOTIVE PNEUMATIC CASING AND TUBE SHIPMENTS, PRODUCTION, AND INVENTORY—OCTOBER, 1945—FIRST 10 MONTHS 1945-1941

	Original Equipment	Replacement		Export	Total Shipments	Production During Month	Inventory End of Month
Passenger Casings		War Orders	Civilian				
October, 1945	173,374	840	3,057,558	20,156	3,251,928	3,627,221	
September, 1945	136,464	1,332	2,366,059	15,165	2,519,020	2,600,089	1,291,836
First 10 mos., 1945	545,125	122,317	19,053,590	158,820	19,879,852	20,672,411	1,671,932
First 10 mos., 1941	17,755,341		31,277,636	552,240	49,585,217	45,364,280	3,065,954
Truck and Bus Casings							
October, 1945	276,560	22,049	785,638	33,063	1,117,310	1,072,711	
September, 1945	209,393	29,942	652,732	34,735	926,802	831,820	711,250
First 10 mos., 1945	4,423,635	4,582,855	5,112,151	216,077	14,334,718	14,330,464	679,689
First 10 mos., 1941	3,931,606		5,178,717	815,526	9,925,849	9,239,823	1,056,882
Total Casings							
October, 1945	449,934	22,889	3,843,196	53,219	4,369,238	4,699,932	
September, 1945	345,857	31,274	3,018,791	49,900	3,445,822	3,431,909	2,003,086
First 10 mos., 1945	4,968,760	4,705,172	24,165,741	374,897	34,214,570	35,002,875	2,351,621
First 10 mos., 1941	21,686,947		36,456,353	1,367,766	59,511,066	54,604,103	4,122,836
Passenger, Truck and Bus Tubes							
October, 1945	469,512	31,975	3,375,761	47,083	3,924,331	4,274,444	
September, 1945	349,518	52,222	2,618,209	43,182	3,063,131	3,061,449	2,707,621
First 10 mos., 1945	5,060,846	4,601,286	22,062,509	304,916	32,029,557	32,898,015	3,175,366
First 10 mos., 1941	21,645,821		30,703,323	1,131,997	53,481,141	50,947,606	4,447,558

R. S. Wilson, Goodyear vice president and the most recent Director of Rubber Programs for the government, called the action in discontinuing tire rationing "a good thing in an overall sense". At the same time he predicted that the shortage of passenger tires will continue throughout 1946.

According to Mr. Wilson, the normal demand for replacement passenger-car tires in 1946 is 27,000,000 casings. There is on top of this a backed-up demand due to war shortages of 17,000,000 casings and an estimated need of 22,000,000 additional for new cars. This adds up to 66,000,000 casings needed for 1946. The industry is now producing at the rate of about 50,000,000 units per year, thus leaving a potential shortage of some 16 million units.

"However," Mr. Wilson explained, "the production of new cars is hardly started and until it does get under way, tire requirements for this purpose will be diverted to filling the needs of private car owners. This will help the picture materially."

The reaction of the RMA, ten days after the end of tire rationing was announced, has been reported previously. Apparently the difficult job of allocating the still insufficient supply of passenger-car tires will be shifted from the OPA to the tire dealer.

RMA October Tire Report

In the regular monthly tire report issued on December 26 for the month of October the RMA stated that American tire manufacturers increased their production more than 36% in October over the preceding month, while shipments increased 26.8%. Exports, however, continued to lag far behind 1941 rates.

While passenger tire production climbed to 3,627,221 units in October, it was noted that production is still running short of capacity. The industry needed approximately 7,000 additional workers in October. This combined with the six-hour working day operative in many plants left passenger tire production 2,372,779 units short of the industry's estimated capacity of 6,000,000 tires a month.

The detailed report is given above.

L. Albert & Son, dealer in rubber machinery, Trenton, N. J., has opened a new office in Room 1365, 120 S. La Salle St., Chicago, Ill.

Management-Labor Relations

Paradoxically, as the year 1945 drew to a close, NLRB strike votes by the employes of major rubber companies taken late in November and early in December expressed intentions of striking, but expressions of union officials and the sentiment of the union members seemed much more moderate than during the Summer of 1945. The URWA convention in Grand Rapids, Mich., during December also ended on a moderate tone. L. S. Buckmaster, who was selected by Sherman Dalrymple for the presidency of the union when the latter resigned last fall, was elected unanimously to a second term. The URWA voted "moral and financial" support for the United Auto Workers Union in its strike against General Motors Corp., but there is little possibility of the rubber workers striking in sympathy, it was reported. Wage negotiations and strike actions seemed to be marking time and awaiting the outcome of the UAW-General Motors strike.

NLRB Strike Votes and Akron Union Elections

The NLRB strike votes held by the local unions in Akron, O., during late November and early December resulted in a vote of 2,627 for and 1,609 against strike action at the Firestone Tire & Rubber Co. and a vote of 1,328 for to 821 against at the Goodyear company. No report is available of a vote at the Goodrich plants or the vote at the plants of the Seiberling Rubber Co. A report from the Firestone company's California plant stated that a vote of 599 for to 55 against had been recorded there. All these votes were taken in an effort to enforce demands for increased wages. No dates have been set for actual strike action, and the general impression is that such action will be delayed for at least one or two months or whenever the results of the UAW-General Motors strike set the pattern for all management-labor disputes of this type. The test case for the URWA has been the negotiations with U. S. Rubber, stymied at present after the company offered a 10c an hour wage increase which the union refused.

The run-off elections for presidents of the Akron local unions have apparently resulted in the election of George Bass to head Goodrich local No. 5, I. H. Watson to continue as president of Firestone local No. 7, and C. V. Wheeler to continue as president of Goodyear local No. 2.

The URWA Convention

The tenth annual URWA convention at Grand Rapids in mid-December resulted in the unanimous election of L. S. Buckmaster as president for a second term. This was reported as meaning that the majority of delegates to the convention continues to prefer the rational wage increase negotiation tactics of Mr. Buckmaster. Possible strikes in the rubber industry over the wage increase issue were considered to be at least a month or two in the future. Wage negotiations with U. S. Rubber will be resumed after it is known what settlement is effected in the General Motors strike. It was reported that belief in URWA circles is that U. S. Rubber will increase its offer of 10c an hour increase, but unless U. S. Rubber does come through with something acceptable to the union, chances are that there will be strikes first in that firm.

Although the URWA recommended that its members give "moral and financial" support to the United Auto Workers in its strike against General Motors, there was little possibility of a sympathy strike by the rubber workers, according to Mr. Buckmaster, who said that the rubber workers have problems of their own to settle. The union's executive board notified its legislative representatives to record the URWA as opposed to the Norton bill, which contains the recent recommendations of President Truman on labor disputes.

Goodyear Umpire Resigns

William Simkin, impartial umpire for Goodyear Tire & Rubber Co. and the local URWA union in Akron, resigned effective December 15 because of the fact that the Goodyear local union refused to accept his ruling on the six-hour-day dispute. The Goodyear company notified the local union that it would renounce the maintenance of membership and check-off clauses in the union contract by December 15, if Mr. Simkin's ruling that many of the Goodyear workers return to an eight-hour day was not complied with. The company's action was in turn defied by the local union when Mr. Wheeler stated that the local union membership would see to it that no one but those holding union cards would be permitted to enter

the plant and work if these clauses were disregarded by the company.

Kelly-Springfield and Baldwin Strikes End

The strike at the plants of the Kelly-Springfield Tire Co., Cumberland, Md., which began on October 31 over the issue of increased wages, ended on December 2 when members of local No. 26, URWA, voted to accept a 13c an hour increase and a 3c an hour differential for those working between 6:00 p.m. and 6:00 a.m.

A 13-day strike at the Baldwin Rubber Co., Pontiac, Mich., ended on December 10. Negotiations between the company and URWA local union No. 125 are scheduled for the near future, the local union president said. Company officials declined to make any statement regarding terms of the settlement of the dispute between the company and the employes which developed over the failure of the company to rehire a man said by the company to lack seniority rights.

The Philip Carey Mfg. Co., Lockland, Cincinnati, plans to spend $5,000,000 for plant modernization and expansion, it was announced by R. S. King, president. Plants affected by the program include those at Lockland; Middletown, O.; Perth Amboy, N. J.; Plymouth Meeting, Pa.; and Lennoxville, P. Q. Canada. Several of the projects will be started immediately. Plans include erection of several new plants at Lockland, Perth Amboy, and Plymouth Meeting. The capacity of the Miami Cabinet Co. in Middletown, manufacturer of bathroom accessories, will be doubled; the Lennoxville plant will be equipped to produce a full line of asphalt products and to increase production of asbestos insulation; while the Carey Research Laboratory at Lockland is to be doubled in size with a portion of the new laboratory facilities to be devoted to extension of research and development of new products for the building and insulation field. Besides this expansion program, additions to the plants at Lockland and Perth Amboy, begun during the war, are about ready to start operation. According to President King, several new products will be put on the market as a result of the expansion program.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has announced the use of neoprene for jacketing "drop wires" or "loops", major sources of failure in cable communication systems. Neoprene-jacketed drop wires, under the name of "Teleprene," have been developed by the Whitney-Blake Co., New Haven, Conn., manufacturer of telephone wire since 1899, and are being installed in various communities throughout the country. The neoprene jacket is applied over the rubber insulation and is designed to protect the wire from damaging influences, such as abrasion, heat, sunlight, cold, moisture, acid fumes, and others. Another feature of the "Teleprene" wire is the unusually good adhesion between the wire itself and the rubber insulation, which is achieved by an electro-plating method known as "Teleplate." The neoprene-jacketed wires are being produced in a parallel wire construction, in which the two wires are encased by a neoprene coating as a single unit, and in the twisted pair arrangement of two separate wires. Each of these types is offered with or without fabric re-enforcement under the neoprene cover.

The Office of Defense Transportation, Washington, D. C., announced November 30 the closing and termination of all the activities of the Washington and regional offices of the highway transport department, effective December 1. At the same time, the rationing of all new commercial motor vehicles, last remaining ODT control, over rubber-borne highway transportation, also ended.

OPA Changes

Uniform maximum prices have been established for sales of two types of rubber made from gas mask scrap and reclaimed for the government (Order 89 under Supplementary Order 94—Maximum Prices for Sales of Reclaimed Rubber Made from Gas Mask Scrap —effective December 17, 1945). The ceilings are 10c a pound for rubber without carbon black and 6c a pound for rubber with carbon black content. The same ceilings apply on sales by government agencies to any buyers or by resellers to industrial consumers. Where the reclaimed rubber is sold by a government agency to a reseller, it is expected that the prices will be below the established ceilings so that the reseller may realize a margin on his sales, OPA said. Rubber manufacturers buy this reclaimed rubber for use in making heels, soles and other rubber items.

Previously there had been only one 10c ceiling, which applied to sales of rubber without carbon black by the Rubber Reserve Co. to industrial users. Rubber Reserve has been abolished, and sales of this reclaimed rubber will be made by other government agencies as well as by resellers.

OPA on December 7 added about 200 minor household, professional and commercial items to its list of products exempt from price control, including: anti-splasher faucet attachments, garment bags (except paper), plastic flower boxes, rubber bottle stoppers usually sold as liquor accessories, elastic chest pulls, medicine balls, glider raincoats, life buoys and preservers not covered by MPR 403, life saving equipment except articles covered by MPR 149, 157, 220, or 403, and rubber shapes and figures (inflated) used for display or advertising.

Amendment 51 to RMPR 373 revises the tables listing maximum retail prices for new synthetic rubber passenger-car and motorcycle tires and tubes sold in Hawaii. Amendment 52 changes the references to ceilings for a rayon tire.

The following orders have been added to RMPR 598—Tires and Tubes, Recapping and Repairing, and Certain Repair Materials — authorizing retail maximum prices for the new products specified: No. 70, 24 Fisk pressed-on type of industrial solid tires made by United States Rubber Co., New York, N. Y.; No. 71, nine off-the-road truck tires, The Goodyear Tire & Rubber Co., Inc., Akron, O.; No. 72, one truck and bus and two mud-and-snow tires, The B. F. Goodrich Co., Akron; No. 73, 13 U. S. Royal tractor industrial grader tires, U. S. Rubber; No. 74, one Rock Grip excavator tire, Firestone Tire & Rubber Co., Akron; No. 75, "Oil Pruf" neoprene industrial solid pressed-on and Vulc-on tires and "Oil Pruf" neoprene Vulc-on replacement treads, Goodrich; No. 76, one farm tractor front, one passenger-car, and one aircraft tire, Goodyear; No. 77, a rear tractor tire, rice and cane field special, Goodyear.

Order 91, SO 94, establishes maximum prices for sales by any agency of the United States Government and for sales by all subsequent resellers of six types of men's new vulcanized rubber footwear items declared surplus by the Armed Forces and now being sold to civilians.

Amendment 14 to MPR 132 redefines "women's warm-lined (shearling)" gaiter as "women's warm-lined (shearling trim)" gaiter as more adequately descriptive of the product and also establishes dollar-and-cents ceilings for two new footwear items made of Buna S: misses' warm-lined gaiters (shearling trim) and child's warm-lined gaiters (shearling trim).

Order 4, RMPR 229, sets retail ceilings for neoprene-latex-dipped waterproof footwear items bearing the brand name "Gemflex" and made by Gem Rubber Corp., New York, N. Y.

Last month the following orders were issued for MPR 188 to set ceiling prices for the products specified: No. 4721, complexion brush made by Manco Rubber Co., 68 Jay St., Brooklyn, N. Y.; No. 4730, stair treads, door mats, landing mats, and eyelets, Ace Rubber Products, Inc., Akron, O.; No. 4742, bath mats, Kirkhill Rubber Co., 811 W. 58th St., Los Angeles, Calif.; No. 4743, rubber strip mats, Milstead Rubber Co., 2802 Washington Ave., Houston, Tex.; No. 4749, rubber sink stopper, Controla Mfg. Co., 1219 W. Van Buren St., Chicago 7, Ill.

Order 36, SO 119, authorizes price increases by The Sun Rubber Co., Barberton, O., for sales of the toys, housewares, and stationers' goods which it manufactures from natural rubber and which are covered by MPR 188.

Amendment 3, RMPR 129, to help assure adequate supplies of gummed cloth tape during the reconversion period, increases manufacturers' maximum prices for the product. This price rise was necessitated by recent increases in the ceilings for sheetings and osnaburgs as well higher costs for other raw materials and for labor.

Two orders recently were added to MPR 478, authorizing maximum prices for coated fabrics made by the companies indicated: No. 155, Aetna Coated Fabrics, Inc., 30 E. 20th St., New York, N. Y.: No. 156, Gae Fabrics Co., 115 Beach St., Boston 11, Mass.

Amendment 2, Order 58, MPR 580, establishes a maximum retail price for the Zephyr coat made by Rainfair, Inc.: while Amendment 2 to Order 208 does likewise for a ladies' raincoat and a boys' hat and coat, made by Climatic Rainwear Co., Inc.

Order 55, MPR 149, establishes ceilings for fruit jar wrenches made of neoprene and reclaimed rubber by Twin City Rubber Works, 111 S. Second St., Minneapolis, Minn.

Order 21, MPR 86, approves ceilings for sales by dealers of five models of washing machines, products of the Firestone Tire & Rubber Co., Akron.

NEW ENGLAND

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Carl Bloom

Carl Bloom, president of Raw Materials Co., Boston, Mass., has announced the opening of a New York office at 220 E. 42nd St. Anticipating a prompt discharge from the Navy, Commander Edward F. Heckman has been appointed manager. A graduate of Allegheny College, B.Sc. in Chemistry, he was associated with The B. F. Goodrich Co. in chemical, engineering, and mechanical sales divisions for more than 20 years prior to the war. His experience covered all phases of the industrial application of rubber products in every type of industry. Entering the Navy four years ago, he was commissioned lieutenant commander, and assigned to the Bureau of Ships. In the raw materials section of the Ship Building Division, his responsibilities were concerned entirely with rubber and chemicals. In this capacity, he worked with both industry and the Navy in planning the conservation of rubber and other critical materials. In 1944 he was advanced to the rank of commander.

The H. O. Canfield Co., manufacturer of rubber and synthetic rubber products, Bridgeport, Conn., has established a new design engineering service available to the automotive, aviation, electrical, and general industrial, as well as to the plumbing, medical, drug sundry, and air conditioning fields. The function of this new department is to study regular and special requirements for component rubber or synthetic rubber parts. Upon request, The H. O. Canfield Design Engineering Service will make a careful study of the end use of a product to determine what type of rubber or rubber compound best fills requirements.

Athol Mfg. Co., Athol, Mass., through President E. A. Clare, has announced a newly improved simulated leather known as Terekan 12 which strongly resembles genuine leather in many respects, including workability, eye appeal, and flexibility. This product was developed to relieve the current scarcity of coated cotton base sheetings. Terekan 12 consists of a strong, tough rope fiber base saturated with a synthetic latex which imparts aging and strength properties superior to those obtained with natural latex. The saturated rope fiber base is coated with pyroxylin. The product is available in any embossed leather grain and in any color, with the exception of pure white, and including two-tone or Spanish finish. Terekan 12 comes in 40-inch width only and in an average thickness of 0.012-0.015-inch, which corresponds to the thickness of a lightweight sheepskin. Terekan 12 is suitable for use in book bindings, picture frames, cosmetic novelties, cases, and other applications where leather-like materials are used.

Remington Rand, Inc., Stamford, Conn., has engaged Col. Walter L. Savell as chief research chemist of the Laboratory of Advanced Engineering at South Norwalk, Conn. Colonel Savell, for the past 3½ years on active duty with the Chemical Warfare Service, worked on the evaluation of all captured chemical, medical, synthetic fuel, synthetic rubber, and other facilities

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Opens Boston Office

Binney & Smith Co., manufacturer, exporter, and importer of blacks, colors, clays, chemicals, and talc, 41 E. 42nd St., New York 17, N. Y., has made three changes in its organization, it was announced last month by J. M. Hamilton, assistant to the president. The company has opened a new office in the Park Square Bldg., Boston, Mass., to serve all New England except Connecticut, which will be covered by the New York office. Resident manager of the Boston office is Allan W. Bryant, who joined the company in August, 1937, after his graduation from Dartmouth College. He was in the technical service department of the company for 4½ years in New York and then spent the next four years in the Akron sales department. Mr. Bryant was born in Weymouth, Mass., August 8, 1916.

L. W. Reeves has joined the Binney & Smith sales staff, working from the Akron office. Born August 28, 1909, in Alliance, O., he attended Cornell University and Case School of Applied Science. After having served as heavy industrial representative for Commercial Investment Trust of New York, he entered the purchasing department of Hooker Electro Chemical Co. Before coming to Binney & Smith, Mr. Reeves had been assistant director of purchases for Dayton Rubber Mfg. Co., Dayton, O.

R. A. Emmett is now a member of the company's technical service division, also working from the Akron office. He was born in Detroit, Mich., on April 7, 1917. In 1940 he was graduated from the University of Michigan with a B.S. in chemical engineering. For five years prior to November, 1945, when he entered the employ of Binney & Smith, Mr. Emmett had been with The B. F. Goodrich Co., Akron, working mainly on research and development compounding of synthetic rubbers.

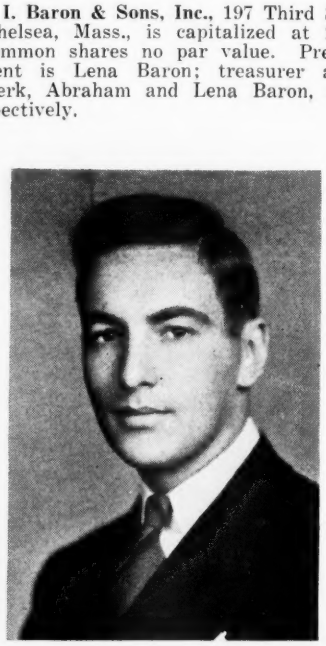
Arthur D. Little, Inc., industrial research organization, Cambridge, Mass., has engaged Helge Holst to serve as assistant to President Earl P. Stevenson. Mr. Holst was most recently at the radiation laboratory M.I.T., engaged in facilitating the transition of research developments from laboratory to production.

Ralph B. Rogers, president of the Armstrong Rubber Export Corp., New York, N. Y., has been elected president and general manager of the Indian Motorcycle Co., Springfield, Mass.

Godfrey L. Cabot, manufacturer and distributer of carbon blacks and pine distillates, Boston, Mass., has appointed Raw Materials Co., also of 77 Franklin St., Boston, as exclusive New York, N. Y., agent for its products, with New York offices in the *Daily News* Building. The previous agent for Cabot in New York had been C. J. Osborn Co. H. N. Richards Co. will continue as Cabot agents in the Trenton and Philadelphia area, and Commercial Chemicals, Inc., will remain as the Cabot agent in Buffalo and vicinity. During the war years the entire production of the Cabot company was devoted to the manufacture of products ranging from carbon blacks for military tires to gun barrels. Now, however, it is devoting its best efforts to the requirements of peacetime production and expansion.

The Cabot company has reappointed to its sales staff Donald Simonds, recently back from 32 months in the Pacific and honorably discharged a lieutenant (senior grade) from the United States Navy early in December. Before enlisting in the Navy in June, 1942, as an apprentice seaman, Mr. Simonds had been on the laboratory and technical sales staff of the Cabot company and also had done work on gas mask carbon and other products for the government.

I. Baron & Sons, Inc., 197 Third St., Chelsea, Mass., is capitalized at 200 common shares no par value. President is Lena Baron; treasurer and clerk, Abraham and Lena Baron, respectively.



Allan W. Bryant

EASTERN and SOUTHERN

Sun Chemical Acquires Warwick

As part of a postwar expansion program, Sun Chemical Corp., New York, N. Y., formerly known as General Printing Inks Corp., has acquired Warwick Chemical Co. and all its subsidiaries. Ernest Nathan continues as president of Warwick, whose policies and personnel remain unchanged.

William Talbot, technical director and secretary of Sun Chemical, becomes president of its fine chemical division which includes, in addition to Warwick, the pigment division of the parent company.

Sun Chemical, in announcing the acquisition, said that sales of the combined companies including Warwick for 1944 were in excess of $20,000,000. It is also pointed out that the merger will enable Warwick Chemical to draw heavily on the large and important research facilities of the new organization in the development of its fine chemicals for textile, paint, plastic, rubber, and other fields as well as market new products already developed by the Sun company.

Among the important products of Warwick Chemical, produced in its factories at West Warwick, R. I., Wood River Junction, R. I., and Rock Hill, S. C., are "Durable Norane" and "Weather-Sealed" Impregnole water-repellents widely used in the rainwear, sportswear, and outerwear fields, which are marketed through the Impregnole Corp., a fully owned subsidiary.

Other subsidiaries affected by the consolidation, are Warwick Wax Co., 221 W. 57th St., New York, and Warwick Wax Refining Co., manufacturer of micro-crystalline petroleum wax and petroleum chemicals, Chanute, Kan.

Ira S. Hurd has been appointed director of textile application of the Warwick company with offices at the West Warwick plant. Mr. Hurd was formerly superintendent of the technical department at Riverside & Dan River, Danville, Va., and has served in various executive technical capacities with Rohm & Hass, Glenlyon Print Works, and General Dyestuff Corp. He is also a BTC graduate from the Lowell Textile Institute.

Ernest Nathan

John Waldron Corp., manufacturer of paper and textile processing machinery, New Brunswick, N. J., announced the return of Lt. Commander Emil Schnitzspahn, U.S.N.R., after 32 months in service. Commander Schnitzspahn, who had been with the company 20 years before entering the service, will take up the position of sales engineer.

The Twentieth Exposition of Chemical Industries will be held in Grand Central Palace, New York, N. Y., February 25 to March 2. With more than 300 exhibitors so far, it will provide an all-inclusive coverage of processing equipment. This year's exposition will place more emphasis on chemical materials in keeping pace with research during the war years. All major items used in the construction and operation of chemical plants and departments of mechanical industries including processing equipment, process controls, and general plant equipment and supplies will be exhibited. Admission to the exposition will be restricted to visitors by invitation and registration at the door in order to prevent overcrowding.

The Manhattan Rubber Mfg. Division, Raybestos-Manhattan, Inc., Passaic, N. J., for the third consecutive year has won the highest award in the National Victory Garden Institute competition. Chairman of the Manhattan Victory Garden Committee is James J. De Mario, advertising manager of the Division.

Essex Rubber Co., Trenton, N. J., has added to its staff of development chemists John S. Cook, formerly with E. I. du Pont de Nemours & Co., Inc., at Newburgh, N. Y., and Rial S. Potter, Jr., formerly with United States Rubber Co. at Chicopee Falls, Mass.

Crown Cork & Seal Co., Baltimore, Md., elected John J. Nagle president to succeed Charles E. McManus, who becomes chairman of the board. Mr. Nagle was succeeded as treasurer by F. Erwin Fusting, who will also continue as vice president. The directors of Crown Cork International Corp., elected Charles E. McManus, Jr., president, succeeding his father, who becomes chairman of the board. The new president is also vice president and a director of Crown Cork & Seal.

Industrial Tape Corp., New Brunswick, N. J., has elected J. S. Nicholls, Jr., president to succeed George F. Smith, president since the company was started as a subsidiary of Johnson & Johnson in 1937. Mr. Smith, who is devoting his entire time now to his duties as president of the parent company, will continue as a director of Industrial Tape. Mr. Nicholls has been executive vice president of the company since 1940 and prior to that time had been in charge of the Johnson filter products division.

H. Walter Grote

H. Walter Grote, former Midwestern district manager of the Wilmington Chemical Corp., New York, N. Y., has been appointed director of export sales of Phillips Petroleum Co.'s Philblack Division. In his new post Dr. Grote, who has had a long career of technical service, both in foreign and domestic fields, will be in charge of all foreign distribution outlets for Philblack. His headquarters will be at the Phillips Petroleum offices, 80 Broadway, New York.

Buys Another Plant

Purchase of a building in Manchester, N. H., for the production of "Lastex" yarn and rubber heels was announced last month by United States Rubber Co., Rockefeller Center, New York, N. Y. The building, purchased from Amoskeag Industries, Inc., has been occupied under lease by the rubber company since March, 1944, and was used during the war in the production of Army and Navy life vests and other war products. The plant now employs 350 people and 150 more are needed, according to Carroll C. Gerrish, local manager.

Personnel Advanced

Herbert E. Smith, president of U. S. Rubber last month announced the election of five new vice presidents: Ernest G. Brown, general manager of the mechanical goods, general products, and "Lastex" yarn and rubber thread divisions; John P. Coe, general manager of the Naugatuck Chemical and Synthetic Rubber divisions; H. Gordon Smith, general manager of the textile division; John W. McGovern, general manager of the tire division; and Elmer H. White, general manager of the footwear and fuel cell divisions. Each new vice president will retain his title of general manager, and will continue his division managerial duties, Mr. Smith said.

L. C. Boos has been elected president of the United States Rubber Export Co., Ltd., and Herbert G. Kieswetter has been elected vice president, according to Mr. Smith, chairman of the board. Mr. Boos, formerly vice president of the export company, will con-

tinue as general manager, and Mr. Kieswetter will continue as assistant general manager.

Mr. Boos was born in Trinidad, British West Indies, and was educated at Montclair Academy, St. Johns-Manlius, thereafter taking special courses in business administration. He began his rubber career in 1923 as an apprentice in a tire plant of U. S. Rubber in Hartford, Conn. In 1926 he became tire sales assistant in the export division and two years later was sent as special representative to Puerto Rico and later to Central America. He subsequently became branch manager of sales in Puerto Rico and Cuba, taking over supervision of the company's Caribbean activities in 1939. In 1941 he was elected vice president with headquarters in New York.

Mr. Kieswetter was born in Astoria, N. Y. He started with the rubber company in 1925 as a salesman, but was soon transferred to export, representing the company in many Latin American countries. In 1941 he was appointed regional director of Latin America and in 1942 assistant general manager.

Willard E. Bittle, factory manager of U. S. Rubber's Woonsocket, R. I., plant, has been named factory manager of the company's footwear plant at Naugatuck, Conn., to succeed Harry L. Carter, who in November completed 52 years with the plant. Mr. Bittle, soon after graduating from college in 1927, started with the rubber company in the production control department of its Williamsport, Pa., plant, later becoming an assistant foreman and industrial engineer. Then in 1929 he was transferred to the Naugatuck plant where in 1936 he became assistant superintendent, a position he held until 1941 when he was asked to reopen and modernize the company's Woonsocket plant for the production of war items. He also directed reconversion of this plant to civilian production.

William A. Mitchel, formerly in charge of coordinating merchandise activities of distributing branches, U. S. Rubber, has been appointed assistant manager of distributing branches with headquarters in New York. A native of St. Paul, Minn., Mr. Mitchel first became connected with the rubber company in 1926 at the St. Paul branch. Following 1931 he acted as credit man at branches in Minneapolis and Chicago and later as operating manager in Indianapolis, Cincinnati, and Detroit. In September, 1944, he was transferred to New York as executive assistant in distributing branches, the position he held until his present appointment.

Mr. Mitchel succeeds Henry G. Noss, recently appointed manager of distributing branches.

S. I. Strickhouser, research and development manager at the Providence, R. I., plant for the past four years, has been appointed assistant factory manager, according to M. G. Burnett, factory manager at that plant. Dr. Strickhouser has been with the company nearly 20 years. He was first employed at the general development laboratories in New York. He was transferred to the Providence plant in 1932 and five years later was made assistant development manager and then development manager in 1941.

R. H. Gerke, formerly of the company's general laboratories and more recently of the Charlotte, N. C., munitions plant, has been appointed development manager at the Providence plant.

The U. S. Tires division recently announced several changes:

W. F. Wrightnour, made merchandise manager, has been actively associated with the tire business since 1928, first working for a distributer, then associated with a brother in his own business. He joined U. S. Rubber in 1940 and has been active in the business development program, which includes advising the distributer on store planning, business management, sales training, and other business building plans.

John S. Lawrence has been appointed district sales manager of the U. S. Denver branch, mechanical goods division. Mr. Lawrence was a mechanical goods salesman in Kansas and western Missouri prior to the war and during the war served as the company's specialist to the aircraft industry at Wichita, Kan. In his new position he will cover Wyoming, Colorado, New Mexico, southwestern Montana, and El Paso, Tex. This territory was formerly under the tentative supervision of J. W. Batten, district sales manager of the Kansas City, Mo., and Tulsa branches. Mr. Batten will now devote all his time to his regular activities.

The Tires division also opened a branch at San Antonio, Tex., with K. N. Carter, formerly at the Cincinnati branch, as district manager.

Herbert E. Smith, president of U. S. Rubber, has been appointed chairman of the rubber division of the $3,000,000 Alfred E. Smith Memorial fund drive.

Other U. S. Rubber Announcements

U. S. Rubber, in its regular Sunday broadcasts featuring the New York Philharmonic Symphony, presented four talks on atomic energy by prominent scientists as part of its series of science talks given during the concert intermissions. Speakers included Hans Albrecht Bethe, of Cornell University, on "Within the Atom," December 2; Harold C. Urey of the University of Chicago, on "Isotopes in Atomic Research," December 9; James Franck, member of Upsala, Copenhagen and Leningrad Academies, on "Medical Benefits from Atomic Energy," December 16; and J. R. Oppenheimer, of the University of California, who was in charge of the laboratory at Los Alamos, N. M., on "The Atomic Age," December 23.

U. S. Rubber will be in mass production of Butyl inner tubes early in 1946, according to W. D. Baldwin, sales manager of the U. S. Tires division. During the war their manufacture had been solely for military use, he said, and at present they are being made for civilians in truck and certain of the larger passenger car sizes.

In comparative tests recently conducted by the company two identical tires were mounted on a car and inflated to the same air pressure, one tire mounted with a Butyl tube and the other with a natural rubber tube. Both were punctured with 3/16-inch nails which were allowed to remain in the tires, and the tires were then run on the car for 91 miles. At the end of the run the tire containing the Butyl tube still had 25 pounds of air pressure, while the tire with the natural rubber tube was flat. Futhermore after standing overnight under the weight of the car, the Butyl tube still had 10 pounds of air the next morning.

U. S. Rubber has evolved a new principle in synthetic passenger-tire construction resulting in stronger and safer tires, planned for production some time early this year. S. M. Cadwell, chief tire scientist for the company, said that until now synthetic passenger-car tires have been rated at about 90% as efficient as prewar rubber tires, but through use of rayon cord and scientific methods of construction the new tire has a stronger, safer carcass than prewar rubber-cotton cord tires. Dr. Cadwell also pointed out the close relation in the development of the automobile and pneumatic tire industries and traced the history of the pneumatic tire from its inception, through changes in design and construction, the introduction of cord tires, the use of carbon black, the development of balloon tires, and the synthetic rubber tire program. Steady improvement in synthetic tire quality can be ascribed to a number of factors, among them being greater uniformity of the man-made rubber itself during production and greater knowledge in the handling of the new material during its fabrication into tires. Now with a multiplicity of materials with which to work, including cotton, chemically modified cotton, rayon, glass, nylon, and steel, the tire scientist is prepared, Dr. Cadwell says, to meet the new and greater demands imposed by motoring in the future.

Because of its ability to resist chemicals and oils in ink, synthetic rubber is superior to natural rubber for inking rollers, printing plates, press blankets, and other printing materials, according to C. A. Russ, printing material specialist of U. S. Rubber. As a result of wartime research, the printing industry now has synthetic rubber products which will wear longer and produce better register than was ever possible with prewar natural rubber, said Mr. Russ, and it is unlikely that natural rubber will ever again be used for these products. Buna N and neoprene synthetic rubbers overcome the principal difficulties encountered with natural rubber, which had a tendency to swell when exposed to ink, throwing the printing out of register, and causing deterioration of the rubber. The printing industry will use synthetic rubber for inking rollers and printing plates, both molded and engraved, as rubber plates have been found far superior for printing on delicate surfaces easily cut or broken by metal plates. The use of synthetic rubber blankets will also be a boon to printers because of the absence of swelling.

U. S. Rubber reports the rubber filtering material used during the war to strain blood plasma for wounded soldiers is back on the civilian production list. Natural rubber allocations have been obtained and full production is expected to start this month, according to C. A. Russ, manager of the company's Multipore department. The material consists of rubber sheeting with as many as 6,400 holes to the square inch. It is highly resistant to corrosion and wear and has a low maintenance cost. Besides medical applications, the material serves as a filter to recover small coal particles during washing treatments in coal mining. Another use is in the straining of fruit juices in canneries. It has also been successfully employed in the processing of various chemicals.

NO PLASTICIZERS NEEDED

with this NEW OIL RESISTANT BUTAPRENE N

THIS new Butaprene elastomer is a compounder's dream — a synthetic rubber, highly resistant to ALL types of oils and solvents, yet one that extrudes with satin smoothness, processes and molds beautifully. *And all without plasticizers of any kind.*

The perfection of Butaprene Type NAA is further evidence of Firestone leadership in the vital new synthetic rubber industry. Outstanding possible uses for this latest member of the Butaprene family are:

Production of rubber tubing, stoppers, closures, seals and molded rubber parts used in packaging liquid foods and drugs, where extraction of plasticizer affects purity, flavor or palatability.

Compounding of rubber products where plasticizer extraction results in leakage, or otherwise interferes with mechanical serviceability.

For complete information regarding Butaprene NAA simply write XYLOS RUBBER COMPANY, DISTRIBUTORS, AKRON 1, OHIO.

BASIC FORMULA

Butaprene NAA	100	Sulfur	1.25
M. T. Black	100	Benzothiazyl Disulfide	1.25
Zinc Oxide	5	Tetramethyl Thiuram Disulfide	0.50
Stearic Acid	1	Total ingredients	209.00

Physical Properties—Slab Cure 10' x 312° F.

Tensile psi	1380
Elongation %	450
Durometer A	68

BUTAPRENE N by Firestone

THE SYNTHETIC RUBBER OF A THOUSAND USES

Resists: OIL • GASOLINE • HEAT • SUB-ZERO COLD • AGING • ABRASION

Listen to the Voice of Firestone every Monday evening over NBC.

Yarnall-Waring Co., Chestnut Hill, Philadelphia 18, Pa., has announced the following personnel changes. At home office and factory, Joseph Kildare has been appointed sales manager; Frank W. Miller has been made works manager, and J. Frank Long has been transferred to the Chicago district office as sales engineer. Charles H. Grosjean, sales engineer in New York office, is now in charge of the Detroit sales office, replacing C. N. Maxfield, appointed California district manager, with new sales offices in San Francisco and Los Angeles. Two new men have been added to Yarway sales staff: Jackson Kemper, New York office, and Jack Schuyler, Los Angeles office; both are sales engineers with long experience in selling and servicing steam plant equipment.

The company has recently begun to publish an eight-page house organ entitled *Yarway News*. Among other subjects, descriptions are included in late issues of trips to Hershey, Pa., and to the University of North Carolina at Chapel Hill, both users of Yarway products.

Witco Chemical Co., 295 Madison Ave., New York 17, N. Y., has added F. E. Rupert to its staff as technical representative. Mr. Rupert who will have his offices in Cleveland, O., formerly was with The Caldwell Co., Akron, O.

H. Muehlstein & Co., Inc., dealer in crude, synthetic, and scrap rubber and hard rubber dust and balata, has announced that Dave Lundquist has joined its staff. Mr. Lundquist, formerly vice president of A. Schulman, Inc., with which he had been associated for the past 16 years, resigned December 12 and is now located at the main Muehlstein office at 122 E. 42nd St., New York 17, N. Y.

OHIO

Sun Rubber Co., Barberton, has announced that Thomas B. Roberts, released from WPB, will act as national sales representative. Prior to his association with the office of the Rubber Director, Mr. Roberts was division manager with Pennsylvania Tire & Rubber Co.

Pharis Tire & Rubber Co., Newark, according to Furber Marshall, president, has named Frank E. Grider personnel director and Frank Benore manager of the Pharis Service Store, Fifth and Main Sts. Before coming to Pharis, Mr. Grider was associated with the regional office of the War Production Board in Cleveland as labor representative and with the same organization in Chicago as associate regional labor representative. Mr. Benore joined Pharis in February, 1945, and represented the company in the northern Ohio territory. Before coming to Pharis, he had been associated with several large rubber companies.

Frostor Combination Refrigerator and Freezing Unit for the Home

Enter Refrigeration Field

The General Tire & Rubber Co., Akron, and The Liquid Carbonic Corp., Chicago, Ill., in a joint statement announcing their entrance into the electric refrigeration field, reported the formation of Frostor and the coming introduction of the first new combination refrigerator and freezing unit for the home.

To produce the new Frostor, a million-dollar factory is under construction at Morrison, Ill. This building, engineered specifically for the production of this new refrigerator has completely new machinery, equipment, and tools and is on one level.

Frostor offers the American housewife many features unique in home refrigeration, according to Max M. Gilman, general manager. The refrigeration unit has 7½ feet of space, and the freezing unit 3½ feet, Mr. Gilman explained. Each compartment has its own cooling unit, an innovation in home refrigerators, which will insure proper temperature throughout the box. There are three kinds of cold in Frostor, said Mr. Gilman: 40 degrees for the normal food storage compartment; zero for the frozen-food storage locker; sub-freezing for the ice making section, between the two compartments. Entirely encircled by chilling coils concealed in the walls, also a departure from conventional designs, Frostor provides cold sleeve cooling which keeps air nearly 90% full of moisture, to eliminate dehydration and keep vegetables crisp and fresh. These coils also eliminate the necessity of frequent defrosting. Defrosting of the refrigerator compartment never will be necessary; while the ice making section need be defrosted only twice a year.

For those with above-average frozen food needs, Frostor also will produce a companion home upright cabinet with ten cubic feet of frozen storage space.

Frostor has opened executive offices at 332 South Michigan Ave., Chicago, under Mr. Gilman's direction.

J. G. Taylor has been named assistant eastern division manager for General Tire. He first joined the company in 1937 as special representative in Washington, D. C. Then in 1942, Mr. Taylor entered the service and became a lieutenant commander. He was discharged in November and returned to General Tire. During his term of service as a member of the Joint Aircraft Working Sub-committee he was commended by the Chief of the Bureau of Aeronautics for outstanding accomplishments.

Goodrich Acquires Hycar

B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, has acquired the assets of Hycar Chemical Co., one of the world's largest private producers of nitrile oil-resistant types of synthetic rubber. Physical assets and trade names of Hycar are now owned by B. F. Goodrich Chemical Co., and all Hycar products will be marketed by the new owner. New Hycar headquarters will be in the Goodrich company's main office in Cleveland. Production will continue in the company's synthetic rubber plant in Akron.

The synthetic rubbers manufactured by the Hycar plant in Akron were developed in 1937 and were the first of their type manufactured on a commercial scale in this country. During the war years Hycar was jointly owned and operated by The B. F. Goodrich Co. and Phillips Petroleum Co.

Since their development Hycar rubbers have found wide use in industry wherever oil and chemical resistance, together with long-life and superior wearing qualities, were necessary. Under the new management, research and technical developments will be accelerated and new fields of industrial usefulness explored.

By the acquisition of Hycar, B. F. Goodrich Chemical Co. supplements its growing list of chemicals, plastics, and synthetic raw materials which now include Geon polyvinyl resins and plastics, Kriston thermosetting plastics, rubber chemicals, organic chemicals, and both natural and synthetic reclaimed rubbers.

Goodrich will erect a new modern plant for the processing of plastics near Marietta, O. The plant, to be located on a 66-acre tract of land on the west bank of the Muskingum river, will consist of a main building having a floor area of 112,000 square feet with auxiliary and service buildings adding 48,000 additional square feet, the company stated. Cost of the entire project will be approximately $4,000,000 and construction work will be started shortly. On completion, this new plant will employ about 250 men and women, and the company's investment will represent at least $16,000 for each job created by the new manufacturing operation.

Personnel Mention

Robert T. Kain, recently placed on inactive status by the U. S. Navy with the rank of lieutenant commander, has been appointed San Francisco district manager of the industrial products sales division. He succeeds H. A. Schulz, who is retiring after having served the company 30 years, all in the industrial products sales division.

Goodrich is already on a current-orders basis in the field of solid industrial tires after cleaning up a large war backlog, announced E. A. Powers, manager of the truck and bus tire department. Although the tire industry may not get completely abreast of pas-

WE'RE HAPPY TO ANNOUNCE

PERBUNAN LATEX

A New Perbunan Polymer!

Here's the right Latex for many different uses... a new and valuable aid to the rubber industry . . . able to solve many specific problems.

TWO TYPES AVAILABLE:

Type "G"—51% Total Solids . . . designed especially for those services where low water absorption is an important consideration.

Type "H"—55% Total Solids . . . designed for those applications where higher concentrations and greater stability are the important considerations.

PERBUNAN LATEX is the RIGHT rubber for:

- Proofing and coating
- Foam sponge
- Impregnating paper, fabrics, glass, cloth
- Combining
- Adhesives
- Protective coatings
- Binders for animal, vegetable and mineral fibers
- Leather dressings
- Binders for flooring materials

PERBUNAN
REG. U. S. PAT. OFF.

THE SYNTHETIC RUBBER THAT RESISTS OIL, COLD, HEAT AND TIME

Stanco rubber technologists know how to develop new rubber parts from Perbunan Latex . . . economically! They can help you with your tough problems. Get in touch with the office nearest you.

STANCO DISTRIBUTORS, INC., 26 Broadway, New York 4, N. Y.; First Central Tower, 106 So. Main St., Akron 8, Ohio; 75 East Wacker Drive, Chicago 1, Illinois. West Coast Representatives—H. M. Royal Inc., 4814 Loma Vista Avenue, Los Angeles 11, California. Warehouse stocks in New Jersey, Illinois, California and Louisiana.

Copyright 1946 by Stanco Distributors, Inc.

senger-tire demand until some time in 1948, by means of stepped-up production capacity the company is able to fill all orders for 75 sizes of industrial tires, including all of the more popular sizes.

Addressing the Indiana Equipment Dealers Association, E. B. Newton, director of Goodrich's research laboratories' technical service, stated that many new and improved products will reach American farms just past the turn of the year. Among items specified were sponge rubber mattresses for cattle for increasing milk production, rubber track crawler-type tractors, rubber-lined silos, leakproof zippers, greatly improved rubber footwear, sponge rubber seat cushions and mattresses, fat-resisting milking machine tubing, better light-aging waterproofed textiles for farm equipment, and better synthetic farm tires. Natural rubber of an excellent grade from *kok-saghyz* as an annual American farm crop was also heralded by the speaker as a promising future possibility.

Speaking before the Pittsburgh Advertising Club on December 4, Howard E. Fritz, director of research for Goodrich, stated that the real usefulness of atomic energy will come when we learn to control that release of energy and to keep it controlled through the whole reaction. The required continuation of research work in this field is handicaped by the dearth of scientific talent due to the war and selective service policies. In addition, such research work must be international in scope as science and creative thinking cannot be legislated. A realistic approach is necessary to counteract the speculation and irresponsible popularization of atomic power which can only lead to fear, false hopes, and unrest.

A speaker at the nineteenth annual sales executives conference sponsored by the St. Louis Chamber of Commerce, Goodrich Vice President J. J. Newman termed the present period, from the sales standpoint, "The Postwar Bulge." He said the unsatisfied demand built up during the war, plus current demand, has created the greatest seller's market the country has ever seen and is apt to create a complacency in sales effort for which companies and the country will pay a high price later. He warned against a letdown in aggressiveness and thoroughness on the part of sales management and stated that although companies must be permitted to adjust selling prices to points where reasonable returns are possible, it will be up to sales management, through proper control of their part of costs, to keep necessary price increases as low as possible. A poll he conducted among sales executives of a number of leading companies showed that "shortage of productive labor" and "shortage of components or parts" tied for first place as chief impediments to 1946 sales plans, with "strikes, slowdowns, and stoppages" lumped together as the next most serious deterrent.

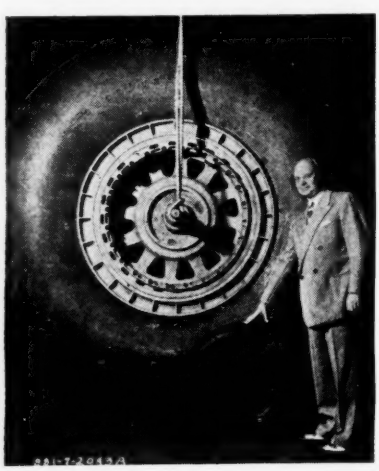
The B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, has announced that, formerly sold for special purposes to the rubber industry, a number of its chemicals have now been made available for sale to the general chemical industry. Available in commercial quantities are: phenyl β naphthyl amine, mixed mono- and diheptyl diphenyl amines, isopropoxy diphenyl amine, p hydroxy diphenyl amine, n-nitroso diphenyl amine, diphenyl p phenylene diamine, di β naphthyl p phenylene diamine, monobenzyl ether of hydroquinone, di isopropyl dixanthogen, mixed ethyl and dimethyl mercaptothiazoles, and mixed aliphatic thiazyl disulphides. Dibenzyl ether of hydroquinone is available in pilot-plant quantities.

New Fabric Tank Developed

The Goodyear Tire & Rubber Co., Akron, recently made the following announcements:

After eight months of development work and testing Goodyear reported the development of Pliocel, a nylon rubberized fabric tank which has attracted interest in the weight-conscious aviation industry. According to R. W. Richardson, manager of the aviation products division, Pliocel is lighter in weight, has more flexibility, and is more crash resistant than either the conventional metal or rubber tanks. In addition it eliminates the leakage so often encountered with metal tanks. This nylon material weighs only 0.075-pound per square foot, while metal tanks average 0.5-pound per square foot; bladder-type rubber tanks weigh 0.42-pound per square foot, and bullet-sealing fuel tanks for military planes weigh approximately 2 pounds per square foot. During testing, a nylon fuel cell withstood vigorous spot abrasion by a stiff-bristle scrub brush, which wore out after 75,000 strokes, without springing a leak and with little or no wear to even the surface lacquer. Because of increased flexibility and extreme lightness, Pliocel tanks are easy to install and remove. They can be folded up for insertion through a small access door and snapped into place by glove-type fasteners attaching to supporting aircraft structures. These tanks are in use on some 30-odd plane models made by 18 companies.

What is said to be the largest bomber tire in the world was conceived, developed, and built by Goodyear in Akron. The tire measures 110 inches in overall diameter, 44 inches across the beads, and 36 inches from one sidewall to another. The complete assembly weighs 2,600 pounds. Weight of the tube alone is 250 pounds. Some idea of the size of this tire is given in the accompanying photograph.



President E. J. Thomas, Goodyear, Comparing a Standard 6.00-16 Automobile Tire with the New Giant Bomber Tire

K. J. Kernochan, Los Angeles, has been named West Coast district manager of the aviation products division of the Goodyear company. Mr. Kernochan, who has been with Goodyear since 1917, when he started in mechanical goods sales in New York, has been successively car dealer and manufacturers' representative in the West Coast city. He has been in aviation products sales since 1941.

Another West Coast appointment, that of William Van Amerongen, Seattle, as Northwest and Alaskan representative, was also made.

Miller Succeeds Mallory

Industrial Rayon Corp., Cleveland, at its board meeting on December 12 elected William C. Miller treasurer to succeed D. S. Mallory, who has retired after holding the position 20 years. Mr. Miller joined Industrial Rayon in 1939 as assistant comptroller after eight years as a certified public accountant with Ernst & Ernst, and has been assistant secretary and assistant treasurer for the past three years. George C. Miller II, associated with the New York firm of Miller, Donaldson & Co. as a certified public accountant for six years prior to his enlistment in the Navy in 1941, has been named assistant secretary and assistant treasurer of Industrial Rayon. He served as a lieutenant in the Pacific, where he was a P-T squadron executive officer, and later as commanding officer of the Motor Torpedo Boat Ferry Command at New Orleans.

Industrial Rayon Corp. has transferred its executive offices from the company's general office building at the Cleveland plant at W. 98th St. and Walford Ave., to new downtown quarters at 660 Union Commerce Bldg., Cleveland. This move was made to provide additional space for the company's engineering and mechanical development staffs, which divisions have been substantially augmented to handle the planning of a new plant which the company has announced and for special work as a result of the sale of patent rights to its continuous process in foreign countries. Hiram S. Rivitz, president, and Hayden B. Kline, vice president, will divide their time between the new downtown office and the Cleveland plant. Treasury, accounting, sales order, and payroll department activities will all be centered at the new offices.

As part of the current newspaper and magazine campaign to acquaint the public with rayon cord tires, Industrial Rayon has arranged for a filming of the use of this synthetic in tires as part of the MGM "News of the Week." The picture contrasts rayon's fashion applications with its qualities as demonstrated in tire applications. The film was made under the supervision of Bernard Lewy, advertising director for Industrial Rayon, and the agency, Al Paul Lefton Co., Inc. It includes scenes taken inside Industrial's Cleveland and Painesville plants as well as shots taken at the plant of one of the country's largest manufacturer of tires. The newsreel was first shown begin-

SUN RUBBER PROCESSING OIL...

Solves Problem for Eraser-Manufacturer Using Increased Amounts of White Substitute

Gray smudges, greasy smears that wouldn't rub clean . . . that was the problem of one of the country's foremost eraser manufacturers.

Restrictions on reclaim, Neoprene, and Buna S. forced an increased use of white substitute. But erasers, made to the new formulas, had a greasy look, couldn't be sold by a house whose name and reputation are known to schoolboys and businessmen across the country.

Plant-engineers called in a Sun Engineer, who studied their processes, recommended that they change from the oil they used previously to a Circo Light Processing-Oil, developed by Sun for the rubber industry.

Greasy surfaces practically disappeared, and production on the new formulas began. In addition, evaporation of oil during the vulcanization was greatly reduced.

Solving problems like this is no novelty for Sun Engineers and Sun Processing Oils.

Now, as you plan to meet the changes in natural and synthetic supplies . . . or whenever processing-problems arise . . . call the Sun man near you and get the latest information on Sun products for better rubber. Or write . . .

SUN OIL COMPANY • ***Philadelphia 3, Pa.***

Sponsors of the Sunoco News-Voice of the Air — Lowell Thomas

SUNOCO **SUN INDUSTRIAL PRODUCTS**

OILS FOR AMERICAN INDUSTRY

ning December 26 at all Loew's first-run houses and will later be released for nation-wide distribution.

Firestone Tire & Rubber Co., Akron, recently was permitted by the War Department to disclose that 100 of its research and production workers in Akron were engaged in operations connected with the atomic bomb. Hundreds of compounds were devised and tested by Firestone physicists and chemists on their phase of the project. Research was conducted for more than a year under the direction of J. H. Dillon, in charge of the Firestone physics research division. The work was carried out under a special research contract with one of the prime contractors for the Manhattan Engineer District. After successful completion of the research, the task of production was turned over to the Firestone Industrial Products Co. which performed the work under the supervision of the physicists and the chemists.

Among those who assisted in the project were R. H. Kelsey, J. W. Liska, and F. S. Grover, of the Firestone Physical research division; L. V. Cooper, of the company's physical testing department; and H. L. Ebert, W. J. Daugherty, J. O. Prohaska, T. D. Maus, H. W. Bell, C. C. Daily, and A. S. Knisely, of Firestone Industrial Products. Another Akronite, Lt. Comdr. Ralph G. Miller, on military leave from the legal department of the Firestone Company, has been serving with the Manhattan Engineer District.

MacGregor Division of Sport Products, Inc., will install all necessary rubber mills, hydraulic presses, winding machinery, and other equipment for manufacturing golf balls at a plant being constructed for this purpose at 4851 Spring Grove Ave., Cincinnati. The company hopes to have the plant in full operation by May or June. C. C. Ryden will be production engineer in charge of all operations.

The Timken Roller Bearing Co., Canton 6, has named as division manager for all divisions of the company Fred Reiser, Jr., Cincinnati district manager for the industrial division since 1944. Mr. Reiser joined the company August 11, 1933, in the industrial engineering department, then was sent to Pittsburgh as a sales engineer on March 15, 1935, and transferred to Cincinnati on June 16, 1941.

Timken has also appointed Harry McCool, who came to the company in 1928 as a hot mill operator, sales engineer for the steel and tube division in the Cincinnati district, which includes Indiana, Kentucky, and part of Ohio. His previous post had been field engineer on Timken Graphitic steels for the territory east of Chicago, since 1943.

The Caldwell Co., supplier of pigments, chemicals, and oils, 2412 First Central Tower, Akron 8, has taken on as technical director, who will also be interested in the sale of the company's various products, Robert H. Crossley. He was graduated as a chemical engineer from Ohio State University in 1934 and was employed continuously thereafter by the Firestone Tire & Rubber Co., Akron, as analytical chemist, compounder, research chemist, control and development chemist, both with the parent company and with its subsidiary, Xylos Rubber Co. The last position he held there was Butaprene sales manager. Mr. Crossley is, moreover, a member of the American Chemical Society; The Akron, Buffalo, Chicago and Detroit Rubber groups; Section IV on Rubber Products of Technical Committee A on Automotive Rubber, jointly sponsored by Committee D-11 of A.S.T.M. and SAE; and The Toastmasters Club, Cuyahoga Falls, O. He also has a number of technical articles to his credit.

MIDWEST

Chicago Production Show

"Production for Profit" will be the theme of the Chicago Production Show to be staged March 20, 21, and 22 at the Stevens Hotel by the Chicago Technical Societies Council, representing 46 scientific, engineering, and technological societies with a combined membership of more than 17,000. According to John F. Seifried, president of the Council, the show will display new materials, methods, tools, and instruments. In addition to society members, thousands of production men from Midwest factories are expected to view the results of wartime advances in production tools, materials, handling devices, control instruments, and factory equipment in general. Manufacturers desiring information should write Paul A. Jenkins, executive secretary, Chicago Technical Societies Council, 53 W. Jackson Blvd., Chicago 4, Ill.

Styrene Plant Damaged

Monsanto Chemical Co., St. Louis 4, Mo., on December 3, following a fire which caused an estimated $500,000 damage to the alkalation unit of the government-owned styrene plant which Monsanto operates at Texas City, Tex., announced efforts are being made to resume production at the earliest possible moment. The fire occurred early December 3, wrecking only the alkalation unit and leaving undamaged the 22-story distillation tower, as well as other near-by installations. It is in the alkalation unit, a 3½-story assembly, that highly volatile crude ethyl benzene is produced for further processing into styrene. The plant, one of the two largest in the country devoted to the manufacture of styrene, was the first major unit to go into production after Pearl Harbor.

Osborne Bezanson, vice president and general manager of the organic chemicals division, said that pending reconstruction of the damaged alkalation unit arrangements are being made to obtain crude ethyl benzene from other styrene producers.

Personnel Changes

Edwin J. Putzell, Jr., until recently assistant to Maj. Gen. William J. Donovan, Director of the Office of Strategic Services, has entered the service of Monsanto Chemical Co. as assistant to Treasurer F. A. Ulmer. A graduate of Tulane University and of Harvard Law School, Mr. Putzell was associated from 1937 to 1942 with the New York law firm of Donovan, Leisure, Newton & Lombard.

Transfer of Frederick Burton Langreck to Monsanto's general development department, where he will specialize in projects for olefin manufacture and utilization, was announced last month. Mr. Langreck, a chemical engineer and one of Monsanto's senior technologists, has contributed importantly to the process chemistry of such volume chemicals as phthalic anhydride, phenol, paranitraniline, sulphuric acid, chlorine, phosphoric acid, and styrene. A graduate of Washington University, he entered Monsanto's service in 1917 as a department chemist and supervisor, later serving in such capacities as manufacturing supervisor, development engineer, operating superintendent, plant manager, and manager of chemical engineering. His most recent assignment was that of organizing a chemical engineering department in Monsanto's plant at Ruabon, North Wales.

Charles S. Cheston, of Philadelphia, formerly a senior partner in the investment banking firm of Smith Barney & Co., recently was elected to the Monsanto board.

Lewis F. Bacon and Henry S. Morse, who retired January 1 as plant superintendent and planning engineer in charge of design, respectively, at Monsanto East Side plant, were guests of honor last month at a testimonial dinner in Hotel Jefferson. A native of La Prairie, Ill., and a graduate of the University of Illinois, Mr. Bacon entered Monsanto's service in 1921 as chief engineer at the company's East Side plant. He became plant superintendent in 1931. Mr. Morse was born in Montgomery County, Mo., and was educated at the University of Missouri and at Central Wesleyan College. He has been planning engineer in charge of design since becoming associated with Monsanto in 1925.

Cutler-Hammer, Inc., Milwaukee, Wis., has appointed John L. Defandorf general engineering supervisor over rubber mill, synchronous motor, valve control, public works, short orders, textile, and paper and printing equipment divisions.

The Dow Chemical Co., Midland, Mich., has extended the area of its Washington sales office, at 915 Shoreham Bldg., Washington 5, D. C., to include Virginia, North and South Carolina, Georgia, and Florida, which territory formerly had been covered by the New York office. The Washington staff, moreover, is being augmented to handle the additional activity resulting from the change.

Phillips Petroleum Co., Bartlesville, Okla., has moved the Akron, O., offices of its Philback division from the First Central Tower Bldg. to 335 S. Main St. These offices are in charge of Frank Andrews, who is sales manager of the division.

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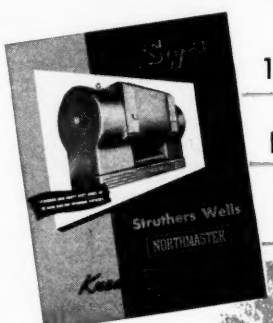

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PACIFIC COAST

To Build in California

Upon returning from the West Coast, Franklin G. Smith, president of The Ohio Rubber Co., Willoughby, announced last month that plans have been completed and contracts let for erection of an auxiliary million dollar plant on Cherry Ave., North Long Beach, Calif. Mr. Smith stated that this additional plant is being built because the large automobile companies plan to do more assembling on the Pacific Coast.

Ohio Rubber has purchased twenty acres of land and holds an option on ten more. Eight acres will be fenced in. The buildings covering 100,000 square feet of floor space will be of steel and concrete. Steel is now under fabrication, and building is supposed to start in April.

It is hoped operation can begin early next summer. The first year's production is estimated at $2,000,000. Chief products will be auto mats, running boards, step plates, and other automotive products. These are manufactured chiefly from reclaimed rubber and petroleum products.

The operation of the plant will require about 200 male and female employes. A very few of the Ohio personnel will be sent to California to start operations.

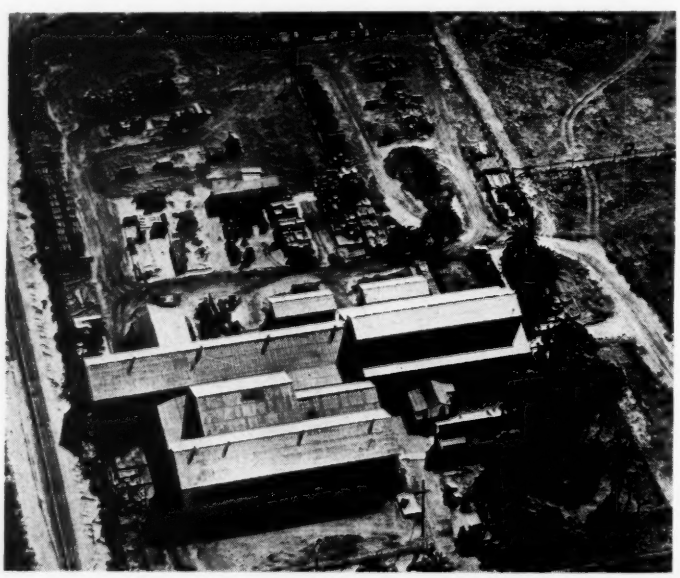
Albert G. Smith of Mentor, O., plant engineer at Ohio Rubber, is still in California completing arrangements and will return temporarily to California to be in charge of construction.

Synthetic Output Up

Since starting production in 1943, 270 million pounds of GR-S, or enough to make 27 million passenger-car tires, have been made at the California Synthetic Rubber Project, operated by six companies at Los Angeles. The 270 millionth pound, included in a 75-pound bale, rolled from the production line during a visit to the plant during December by California newspapermen. Operating officials pointed out that Los Angeles tire plants have reached a production potential of 47,000 tires a day, which would mean a 73,000-ton annual market for rubber. In view of this potential market, it was estimated that synthetic rubber production would level off at about 48,000 tons annually, with the rest of the needed tonnage supplied by natural rubber. Manpower shortage, main obstacle to full reconversion of finished rubber goods production, has taken a sharp turn for the better, and output has risen 30% in the last month. Technological refinements have increased the rated capacity of the plant from 90,000 tons of rubber a year to a potential 110,000 tons annually, produced from oil products which take only 0.3% of a barrel of crude. Rubber can be made at the plant for 10 to 15c a pound, according to Dr. Hebbard, RFC rubber deputy, which compares with prewar natural rubber prices of 12 to 18c a pound. Latex is also now being produced at this plant. In light of official estimates that one-half of the nation's synthetic rubber production will be needed even when natural rubber is available, the permanence of the California project is a probability.

Schulman on West Coast

A. Schulman, Inc., scrap rubber dealer, Akron, has appointed H. L. Alden as branch manager and Russ Hartz as factory superintendent, for the new Schulman plant at Long Beach, Calif., which the company purchased from the Joshua Hendy Iron Works. The site includes 4½ acres of land, 26,700 square feet of floor space, and is serviced by the Union Pacific Railroad.



New Schulman Plant at Long Beach, Calif.

H. L. Alden

Mr. Alden, a graduate of Case School of Applied Science, is an Akron man who learned the rubber business with the Firestone Tire & Rubber Co. beginning in 1925. He was successively manager of stores and by-products, final inspection division, planning department, manufacturing control (Air Wing Plant), and fabric preparation division at Firestone in Akron. Recently he was manager of the material handling division for the United States Rubber Co. in Los Angeles, Calif. Mr. Alden sees the new Schulman plant as an important aid to dealers, mills, and reclaimers through its modern processing equipment and service facilities.

Mr. Hartz also began his career at Firestone in the transportation department in 1916. He became general foreman of the Firestone by-products division and later assistant division manager of the stores and by-products division until joining the Schulman organization last year.

Huntington Rubber Co., 4011 Whiteside Ave., City Terrace District, Los Angeles, Calif., is erecting a new storage room which will provide 1,904 square feet of floor space and cost $2,000.

The Jobbers Supply Co. is the firm name under which George L. Froom has published a certificate that he is conducting a mechanical rubber goods business at 601 Title Insurance Bldg., Los Angeles, Calif.

CANADA

Tariff Changes

Several recent changes in the Canadian tariff apply to products of rubber and synthetic rubber and resins.

Under the old tariff trucks, including rubber mountings and rubber inserted wheels of a class not made in Canada, were free of duty, but now they are

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dutiable at 10% if imported from the United States.

The new tariff on pipe lines is broadened to include such as are made of synthetic resins covered with braided material and coated, which may enter duty free or at the reduced rate, according to type.

Synthetic rubber latex has been put on a parity with natural rubber latex and may therefore also enter the Dominion duty free.

Canada's exports of rubber increased markedly during the first seven months of 1945, as compared with the same period of 1944. In the 1945 period exports of rubber represented a value of $21,956,000, against $13,202,000 in the same period of 1944. Exports of pneumatic tires had a value of $9,649,000, against $8,031,000 in 1944; and of inner tubes, $863,000, against $699,000. In July, 1945, the value of rubber exports was $3,569,000, compared with $2,514,000 in July, 1944; while pneumatic tires came to $1,138,000, instead of $787,000, and inner tubes were $101,000, instead of $60,000.

Dominion Rubber Co., Ltd., Montreal, P. Q., through Herbert E. Smith, chairman of the board of directors of Dominion Rubber and president of the United States Rubber Co., has announced, following a Dominion board meeting, that Paul C. Jones, president of the company since October, 1939, has been appointed vice chairman of the board, and that C. C. Thackray, executive vice president, has been made president. William A. Eden, who has been with the company since 1907, acting as president from 1920 to 1939, and recently vice chairman of the board, is retiring from active service, but will remain a director. During the war, under Mr. Jones' presidency, Dominion Rubber greatly expanded its existing facilities and entered many new fields of production. A large program of reconversion and further peacetime expansion is well under way, and Mr. Jones, in becoming vice chairman of the board, is to continue a close connection with the future administration. Mr. Thackray entered the service of the company in 1920, shortly after being demobilized from the Royal Canadian Artillery with which he served in the First World War. His long experience covers all branches and divisions of the company, and he was particularly identified with the large war supplies program undertaken by the company during the war.

Gutta Percha & Rubber, Ltd., Toronto, Ont., has embarked upon a postwar program of improvements in its local plant. Main objectives of the project are: to insure a high-quality product; to produce it more efficiently; to cut the cost of production; to improve employes' working conditions; to increase earnings.

British American Oil Co., Ltd., Toronto, Ont., has obtained the exclusive franchise in Canada for Fisk tires, which will be manufactured in the Dominion. As part of this program, B. A. Oil also is disclosed to have formed a new tire, battery and accessory department.

Tire Rationing Eased

C. D. Howe, Federal Minister of Reconstruction, in a recent statement issued in Ottawa, Ont., announced a relaxation of tire rationing regulations applying to approximately 365,000 passenger cars and trucks. As of December 1, rationing has been lifted from all used and retreaded tires and virtually all truck tires except those of passenger-car size; while class "B" passenger-car operators are eligible for new tires.

This action is estimated to end tire restrictions for about 230,000 of the 250,000 trucks in Canada. In addition it lifts the restrictions for about 135,000 passenger-car owners in Canada who are in class "B" which includes automobiles operated by bond or insurance salesmen, wholesale commercial travelers, chain-store supervisors, finance company collectors, tax collectors, assessors, and others. Formerly class "B" operators were able only to buy used or retreaded tires. Mr. Howe noted, however, that possibly until February class "B" applicants probably would be able to obtain only two new tires in order that the supply would be spread fairly.

Truck tires in sizes 6:00 by 20-30 by 5, 6:50 by 20-32 6-8 ply, and 7:00 by 20 and over are freed from rationing. Dealers are still not permitted to make any allowance for any used tire or tube taken in exchange for a new tire. Light truck tires in sizes 6:00 by 16-17-20, 6:50 by 16-17-20, 7:00 by 15-16-17, and 7:50 by 16 will continue to be rationed.

All sizes of farm implements and tractor tires other than all 16-inch sizes, 5:25 by 21 and 6:00 by 20 are freed from rationing for replacement and changeovers, but must be sold for and mounted on a tractor or implement only.

E. R. Rowzee, director of research, Polymer Corp., Sarnia, Ont., in a recent address to the Kiwanis Club in London, Ont., expressed belief that Canada is likely to achieve self-sufficiency in rubber supplies in the next few years as a result of Polymer operations. Mr. Rowzee also paid tribute to research work being conducted by various Canadian universities as part of a program of cooperation with Polymer. He mentioned present cooperating universities as Laval, Western Ontario, McGill, McMaster and Montreal and added that a number of universities in Western Canada, as well as the University of Toronto, are due shortly to participate in the program.

Naugatuck Chemicals division, Dominion Rubber Co., Ltd., Elmira, Ont., has added to its technical sales staff Alan R. Clark, formerly of St. Lawrence Chemical Co., Ltd., Toronto, Ont., who is well known in the rubber, paint and chemical industries in Toronto and district where he has been selling chemicals for the past ten years. He will devote his attention to the sale of rubber chemicals in the provinces of Ontario and Quebec for Dominion Rubber.

General Tire & Rubber Co. of Canada, Ltd., Toronto, Ont., has appointed Vincent P. Reid vice president from the position of general manager.

OBITUARY

Harry G. Fisk

A FOUNDER of the Fisk Rubber Co., Chicopee Falls, Mass., Harry G. Fisk, 72, died at his home in Springfield, Mass., on November 30. Funeral services were held at his residence December 2.

Mr. Fisk, a native of Springfield (May 5, 1873), after being graduated from Massachusetts Institute of Technology, became associated with the Davis Electrical Works until 1899. He and his father then organized the Fisk Rubber Co., of which he became secretary-treasurer and his father president. Then from 1926 until 1928 the young Mr. Fisk served as vice president.

During his business career he was president of the Knox Motor Co., Springfield Brick Co., Fisk Mfg. Co., Connecticut Valley Realty Co., vice president of Hodges Carpet Co., and treasurer of the Federal Rubber Co., which was controlled by the Fisk Rubber Co., and the Steere Organ Co.

In addition to his 20-year association with the Colony Club, he was a founder of the Eastern States Exposition, and a director of the Union Trust Co. and the Massachusetts Mutual Life Insurance Co. He was also a member of the Long Meadow and the Springfield country clubs, Union League, Lotus Club, Boston Athletic Club, Automobile Old Timers, Eastern and Essex Yacht clubs, Century Club, and the South Congregational Church, Chamber of Commerce, Springfield Rotary club, and Masons.

Mr. Fisk leaves a daughter, two sons, and six grandchildren.

George C. Siebert

GEORGE C. SIEBERT, manager of the rubber division of Phoenix Mfg. Co., Joliet, Ill., died at his home there following a heart attack on December 11.

Born in Chicago in 1877, Mr. Siebert served as president and general manager of the Powers Rubber Horseshoe Co. and the Harlem Rubber Co. in Chicago. In 1927 he sold his plant to the Phoenix company and moved to Joliet to assume managership of the rubber division of that company.

Mr. Siebert was a member of the Rotary Club, the Elks, and the Masons.

He leaves a wife, a brother, a niece. and a nephew.

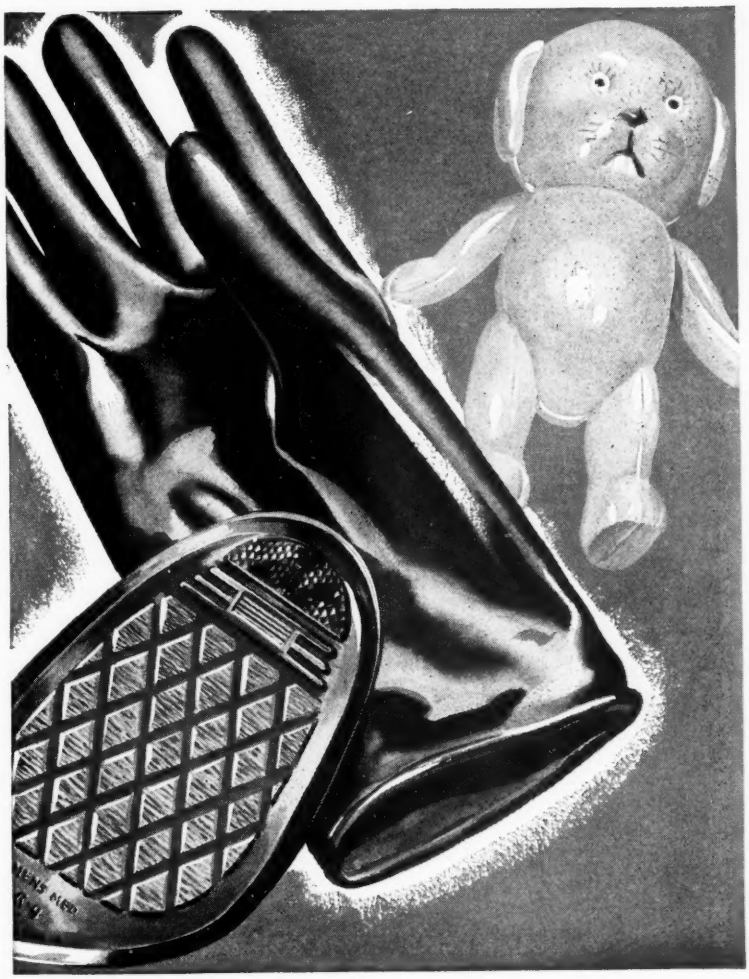
Funeral services were held December 13, followed by interment in Elmhurst Cemetery.

FINANCIAL

Union Asbestos & Rubber Co., Chicago, Ill. Nine months ended September 30, 1945: net income, $405,281, or 87c a common share; net income for all of 1944, $585,662, or $1.26 a share.

Formula for more sales appeal!

YOUR PRODUCTS + JOHNSON'S RUBBER FINISHES



Here's new beauty and extra protection for your rubber products—beauty and protection that will step up appearance . . . make your merchandise more attractive to buyers!

It's Johnson's Rubber Finishes, the *wax* finishes that add so much to the good looks of rubber products. They give rubber goods a lustrous beauty that increases "eye" and "buy" appeal. They add wax protection, too . . . against "shopwear" . . . scuffs and scratches . . . dirt and finger marks. They help guard against oxidation and sun checking, destroyers of rubber surfaces and sales.

Easily applied by spraying, dipping or wiping, Johnson's Rubber Finishes can be inexpensively worked into your production set-up. They resist cracking and scaling, are non-flammable, and available in clear or black.

SEND FOR FREE SAMPLE! See for yourself how a Johnson's Rubber Finish improves the appearance of your product. Fill out and mail the coupon today!

These and many other rubber products are made more saleable by Johnson's Rubber Finishes

Door mats · Hot water bottles · Rubber gloves · Refrigerator gaskets · Rubber toys · Soles and heels · Tires · Garden hose Stair treads · Rubber boots, overshoes

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Gentlemen: Yes, your Rubber Finishes sound good to me. Send me free sample of
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Company .....

Product .....

The Timken Roller Bearing Co., Canton, O. First nine months, 1945: net profit, $4,168,578, equal to $1.72 a share, against $4,611,926, or $1.90 a share, in the first three quarters of 1944.

O'Sullivan Rubber Corp., Winchester, Va. Eight months to August 31; net income, $145,518; net sales, $4,929,978.

New Incorporations

Ohio Rubber of California, Los Angeles, Calif. Capital: $250,000. Directors: Charles K. Arter, A. C. Ernst, and Clark T. McConnell, all of Cleveland, O. Represented by C. T. C. Corporation System, 510 S. Spring St., Los Angeles.

Sherbro Rainwear Corp., New York. Capital: 100 shares no par value. A. N. Davis, 165 Broadway, New York, N. Y. Manufacture raincoats, etc.

Sierra Rubber Co., Los Angeles, Calif. Capital: $500,000. Directors: Claus H. and William F. Vonder Reith and Andrew L. Matelik, all of Los Angeles, Calif. Represented by Frank H. Love, 453 S. Spring St., Los Angeles.

Dividends Declared

Company	Stock	Rate	Stock of Payable	Record
American Hard Rubber Co.	Pfd.	$1.75	Dec. 20	Dec. 10
American Wringer Co.	Com.	0.25	Jan. 2	Dec. 15
Anaconda Wire & Cable Co.	Com.	0.25 q.	Dec. 20	Dec. 10
Armstrong Rubber Co.	Pfd.	0.59⅜ q.	Jan. 2	Dec. 17
Armstrong Rubber Co.	"A"	0.15 q.	Jan. 2	Dec. 17
Baldwin Rubber Co.	Com.	0.175	Jan. 21	Jan. 15
Collyer Insulated Wire Co.	Com.	0.30 q.	Jan. 2	Dec. 20
Dayton Rubber Mfg. Co.	Com. (New)	0.20 init.	Jan. 31	Jan. 17
Dayton Rubber Mfg. Co.	Pfd. A	0.50 q.	Jan. 31	Jan. 17
De Vilbiss Co.	7% Pfd.	0.175 q.	Jan. 15	Dec. 28
Dewey & Almy Chemical Co.	Pfd.	1.06¼ q.	Jan. 19	Jan. 5
Dewey & Almy Chemical Co.	"B"	0.35	Dec. 15.	Nov. 30
Dewey & Almy Chemical Co.	Com.	0.35	Dec. 15	Nov. 30
Dunlop Tire & Rubber Goods Co., Ltd.	Com.	1.25	Dec. 22	Dec. 19
Dunlop Tire & Rubber Goods Co., Ltd.	5% 1st Pfd.	0.62½ q.	Dec. 31	Dec. 15
Faultless Rubber Co.	Com.	0.50	Jan. 1	Dec. 15
Garlock Packing Co.	Com.	0.50 q.	Dec. 28	Dec. 18
General Tire & Rubber Co.	Pfd.	1.06¼ q.	Dec. 31	Dec. 21
B. F. Goodrich Co.	Com.	0.75 yr.-end	Dec. 21	Dec. 7
Goodyear Tire & Rubber Co.	Com.	0.50 q.	Mar. 15	Feb. 15
Goodyear Tire & Rubber Co.	Pfd.	1.25 q.	Mar. 15	Feb. 15
Hercules Powder Co.	Com.	1.00 yr.-end	Dec. 21	Dec. 10
Intercontinental Rubber Co.	Com.	0.35 yr.-end	Dec. 28	Dec. 21
Jenkins Bros.	Com.	1.00 q.	Jan. 3	Dec. 14
Jenkins Bros.	Non-vot.	0.25 q.	Jan. 3	Dec. 14
Jenkins Bros.	Pfd.	1.75 q.	Jan. 3	Dec. 14
Johnson & Johnson	8% Pfd.	4.00 s.	Jan. 31	Jan. 31
Johnson & Johnson	4% Pfd.	1.00 q.	Feb. 1	Jan. 11
Mansfield Tire & Rubber Co.	Com.	0.25 q.	Dec. 20	Dec. 10
Mansfield Tire & Rubber Co.	Pfd.	0.30 q.	Jan. 2	Dec. 20
Minnesota Mining & Mfg. Co.	New	0.20 init.	Dec. 15	Dec. 7
Minnesota Mining & Mfg. Co.	.....	100% stock	Nov. 26	Nov. 13
Rome Cable Corp.	Com.	0.15 q.	Jan. 2	Dec. 14
Seiberling Rubber Co.	Com.	0.25 yr.-end	Jan. 1	Dec. 15
Thermoid Co.	Com.	0.15	Dec. 15	Dec. 6
United Elastic Corp.	Com.	0.30 extra	Dec. 10	Nov. 21
United Elastic Corp.	Com.	0.50 incr.	Dec. 10	Nov. 21

Additional Experimental GR-S and GR-S Latices

ADDITIONS to the list of experimental GR-S dry polymers and GR-S latices available for distribution to rubber goods manufacturers from the Office of Rubber Reserve, RFC, under the condition outlined in our November issue, page 237, have been received and are listed in Table 1.

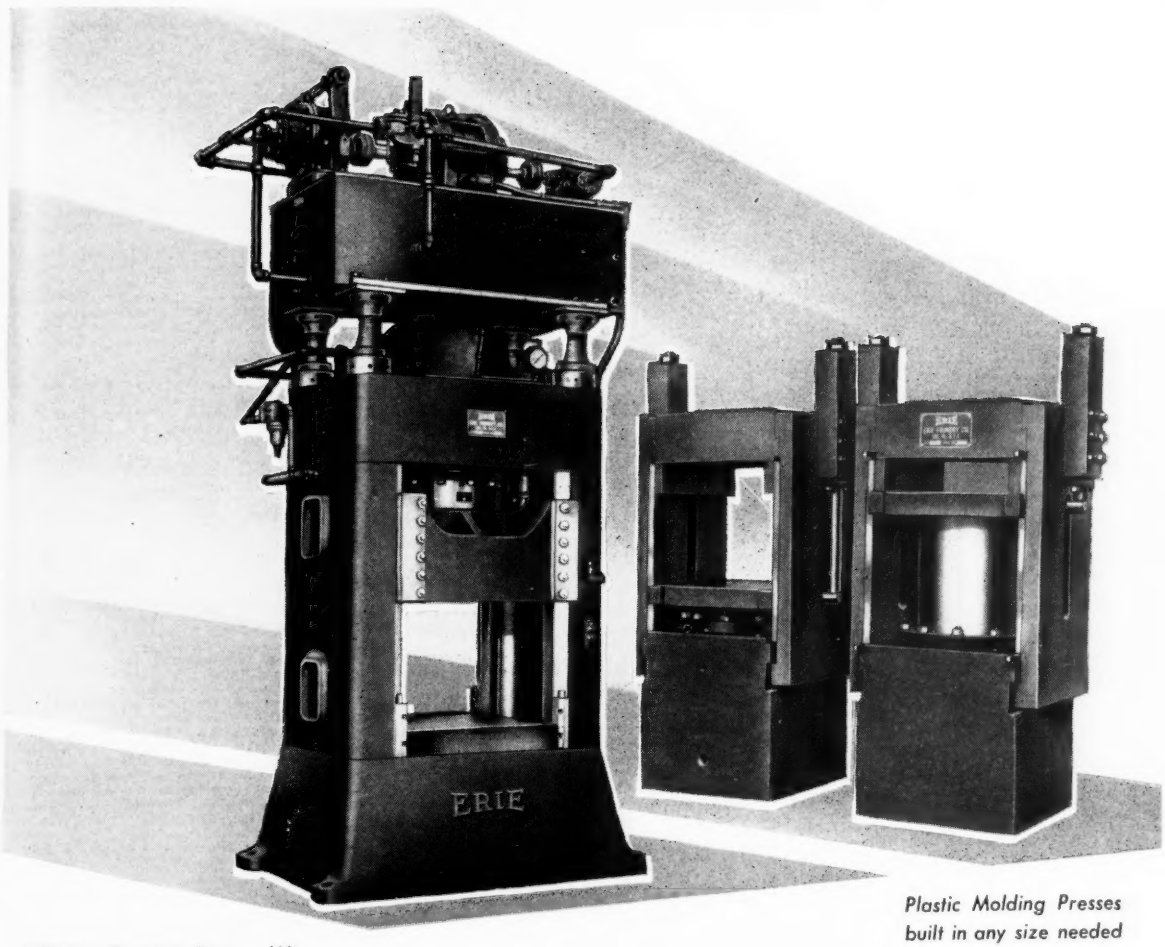
Reauthorizations have been issued for the following polymers (Table 2) which were previously authorized, made and in consumers' tests found advantageous:

TABLE 1

X-Number Designation	Manufacturing Plant	Date of Authorization	Polymer Description	Special Characteristics
X-271-GR-S	U. S. Rubber-Naugatuck	Nov. 7, 1945	GR-S latex with a high solids content of 50-55%.	General purpose use.
X-272-GR-S	U. S. Rubber-Institute	Nov. 6, 1945	Rosin soap GR-S made to high conversion and stabilized with one part Stalite; 95-105 Mooney; acid coagulated.	This rubber has good adhesiveness and cohesiveness imparted to it by its high Mooney viscosity and the use of rosin soap.
X-273-GR-S	U. S. Rubber-Institute	Nov. 14, 1945	GR-S-10 shortstopped with sodium sulphide and stabilized with 1.5 parts EFED; salt-acid coagulated.	Produced for materials where a special non-discoloring antioxidant is required.
X-274-GR-S	National Synthetic-Louisville	Nov. 8, 1945	GR-S-10 shortstopped with sodium sulphide and stabilized with Stalite.	For same purpose use as GR-S-10. Produced for materials where a special non-discoloring antioxidant is required.
X-275-GR-S	General-Baytown	Nov. 27, 1945	Same as GR-S-Black-1 except the GR-S portion has a Mooney viscosity of 30±5 which will be obtained by using the standard recipe and adjusting the modifier.	Same purpose use as GR-S-Black-1. Better processability should be obtained due to the lower Mooney.
X-276-GR-S	Goodyear-Akron	Nov. 28, 1945	Low rosin soap, GR-S latex with a high solids content of 58%.	General purpose use.
X-277-GR-S	General-Baytown	Nov. 28, 1945	Same as GR-S-Black-1, except the GR-S portion will have a Mooney viscosity of 30±5 which will be obtained by using the standard recipe and adjusting the conversion.	Same purpose use as GR-S-Black-1.
X-278-GR-S	U. S. Rubber-Naugatuck	Dec. 6, 1945	50/50 Bd/Sty. ratio, sodium oleate and glue emulsifiers, shortstopped with hydroquinone; two parts PBNA antioxidant, alum coagulated.	Use in closure and sealant compounds.
X-279-GR-S	General-Baytown	Dec. 6, 1945	Similar to X-228 GR-S except SRF Black will be used and GR-S will be reacted to 30 Mooney by means of reduced conversion.	Due to the lower Mooney, this polymer should be easier to process.

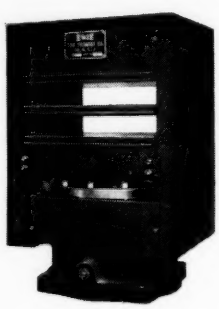
TABLE 2

X 165 GR-S	U. S. Rubber-Institute	Nov. 6, 1945	Regular GR-S coagulated by sulphuric acid.	This type of rubber has a much lower ash content than regular GR-S, making it very suitable for use in the electric insulation field.
X 178 GR-S	U. S. Rubber-Naugatuck	Nov. 7, 1945	Regular GR-S protected with a non-discoloring agent, EFED.	Produced for materials where a non-discoloring antioxidant is required.
X 141 GR-S	Firestone-Akron	Nov. 6, 1945	GR-S made by charging 75 parts isoprene, 25 parts styrene using dehydrogenated rosin soap, 60-70 viscosity.	The isoprene-styrene polymer shows improved hysteresis characteristics in carcass-type stock and may have improved tack. Owing to the presence of isoprene, this polymer is similar to natural rubber in chemical and aging characteristics.



500 ton Forming Press. We also build it in any size required

Plastic Molding Presses built in any size needed



Side Strain Steam Platen Press, built in all sizes

Erie Hydraulic Presses

the Product of 40 years of "Know How"

FOR 40 years, Erie Foundry engineers and craftsmen have designed and built hydraulic presses for rubber and plastics. No requirement is too small and none too big. The experience, "know how", which we have gained over this long period, is built into the Erie Hydraulic Presses which we build for your needs. In planning for your postwar production, it will pay you to consult with us. Your copy of Bulletin 334 will be sent on request.

ERIE HYDRAULIC PRESSES

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Patents and Trade Marks

APPLICATION

United States

2,386,753. **Rubber-Insulated Electrical Conductor and Cable.** J. Shield, Valois, P. Q., Canada, assignor to Western Electric Co., Inc., New York, N. Y.

2,386,754. **Universal Joint Including a Resilient Vibrator-Absorbing Member of Rubber.** J. R. Snyder, assignor to Thompson Products, Inc., both of Cleveland, O.

2,386,791. **A Device Including a Laterally Opening Valve Chuck for Feeding Air into a Pneumatic Tire; the Chuck Has a Rigid, Removable Shank for Connection to an Air Hose, and a Hollow One-Piece Rubber Member Embracing the Shank and Part of the Chuck.** B. Greenwald, New York, N. Y.

2,386,873. **Packing Device for Sealing Two Parts Which Slidably Engage Each Other, Including an Annular Sealing Member Made of an Elastic Deformable Material Bonded to One of the Parts.** J. Mercier, New York, N. Y.

2,386,902. **Thermoplastic Cement for Attaching Soles to Shoes.** C. D. Knowlton, Rockport, Mass., assignor to United Shoe Machinery Corp., Flemington, N. J.

2,386,948. **Typewriter Eraser.** B. W. Hanle, Elizabeth, N. J., assignor to Eagle Pencil Co., a corporation of Del.

2,387,002. **In Apparatus for Cementing the Wall of an Earth Boring, a Series of Nozzles Formed of Resiliently Deformable Material.** C. E. Bannister, Houston, Tex.

2,387,086. **Wringer Mechanism.** C. Moon, Detroit, Mich.

2,387,090. **Torpedo Defense of a Ship Including a Buffer Made up of Boxes of Thin Copper, the Walls of Which Are Separated from Each Other by Layers of Rubber.** G. Provenzano, Greenwich, Conn.

2,387,131. **As Indirect Suture or Seam for Wounds, a Pair of Adhesive Strips Perforated at the Edge to Hold a Lacing Thread.** P. E. G. Fernandez, Mexico City, Mexico.

2,387,181. **Piston Including a Flexible Rubber Sealing Flanged Portion, a Molded Synthetic Resin Rigid Base Portion, and between Both Portions, a Wavy Sheet of Material Chemically Bonded to the Rubber and Presenting Interstices Penetrated by the Synthetic Resin.** A. Proctor, Newcastle-upon-Tyne, England.

2,387,188. **A Shield for the Sidewall of a Vehicle Tire Including a Disk-Like Body and an Annulus of Resilient Material; the Annulus Becomes Ground-Engaging When the Tire Is Accidentally Deflated.** H. Spingler, assignor of 25% to R. H. Spingler, both of Brooklyn, N. Y.

2,387,387. **Track for a Track-Laying-Vehicle.** R. S. Garber, Montreal, P. Q., Canada, assignor to United States Rubber Co., New York, N. Y.

2,387,433. **Rubber-Stemmed Valve for Inflatable Articles.** F. Fenton, Akron, assignor to Sun Rubber Co., Barberton, both in O.

2,387,439. **A Film of Thermoplastic Adhesive for Sealing a Container.** A. P. Grabus, Jr., and A. H. Warth, assignors to Crown Cork & Seal Co., Inc., all of Baltimore, Md.

2,387,455. **Valve for Inflatable Articles,** B. A. McDermorr, Akron, assignor to Sun Rubber Co., Barberton, both in O.

2,387,512. **Phosphorescent Tape Including a Thin Transparent Layer of Rubber, a Layer of Luminescent Pigment and Another Layer of Rubber Adhesive.** F. C. Hilberg, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,387,539. **Flexible Collapsible Fluid Bladder.** A. N. Spanel, New York, N. Y.

2,387,552. **Corselet with Elastic Section.** L. N. Alberts, New York, N. Y.

2,387,567. **Sweat Band of Thermoplastic Material.** F. De Feo, New York, N. Y.

2,387,590. **In a Battery, a Container at Least Part of Which Is Formed from a Thermoplastic Resinous Material.** H. L. Koenig, Maple Heights, W. C. Billheimer, Euclid, and H. T. Havlick, Erieside, assignors to Willard Storage Battery Co., Cleveland, all in O.

2,387,598. **Storage Device Including a Container Having Two Smoothly Curved Portions Opposite Each Other, and a Rubber-Compound Bag in the Container and Fastened to One of the Portions.** J. Mercier, New York, N. Y.

2,387,759. **For an Electrical Condenser, Metal Strips Insulated with Coatings of Polystyrene Solution.** K. N. Jarvis, Winnetka, Ill.

2,387,802. **Separable, Self-Laying Track Having a Continuously Flexible Body Including Rubber-Like Material in Which Is Embedded a Flexible Tension Structure, Cross Bars at Intervals along the Body Connected to the Tension Structure in Drive-Transmitting Relation Solely by Intervening Rubber-Like Material Vulcanized to the Bars and Structure.** R. Mayne, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,387,924. **Fountain-Type Comb Having in Its Back Portion a Longitudinal Barrel Provided with Longitudinally Spaced Rubber Inserts.** C. A. McClure, Chicago, Ill., assignor of one-half to M. A. Sribike.

2,387,930. **Solid Tire Cushion Wheel.** P. Murphy, Brooklyn, N. Y.

2,388,051. **Mount for Eyepieces Having a Body of Plastic Material.** G. E. Guellich, Buffalo, N. Y., assignor by mesne assignments to American Optical Co., Southbridge, Mass.

2,388,097. **Rubber Protector for a Member Operable in Alined Openings in Spaced Blocks Movable Relative to Each Other.** R. J. Turner, Butler, Pa.

2,388,140. **Pile Fabric with Backing Containing Rubber.** W. H. Hall, assignor to Thermoid Co., both of Trenton, N. J.

2,388,146. **Hold-Up for a Loom Lug Strap, Including a Fibrous Frontal Section and a Rubber Vulcanized Fabric Backing Section.** W. Herron, Augusta, Ga.

2,388,184. **Laminated Article Including Layers of Cellulosic Fibrous Material, at Least One Layer of Glass Cloth, and, as Bonding Agent, a Synthetic Thermosetting Amino Plastic Resin.** K. E. Ripper, Bronxville, N. Y., assignor to American Cyanamid Co., New York, N. Y.

2,388,205. **Eye Protector Including a Single Aperture Facepiece of Flexible and Resilient Material Adapted to Fit about the Eyes of the Wearer.** D. P. Bernheim and E. M. Splaine, both of Southbridge, W. H. Lehmberg, Newton, W. Lown, Boston, and C. A. Baratelli, Cambridge, assignors to American Optical Co., Southbridge, all in Mass.

2,388,267. **Box with a Corner Stay Made from a Strip of Thermoplastic Material.** M. P. Junkin, Drexel Hill, Pa.

2,388,309. **Fuse Protector Device Including Rubber Tubes Rolled Separately on to a Stick.** J. S. Curtiss, El Paso, Tex.

2,388,310. **A Device to Unite a Blasting Cap Member and a Fuse Member Leading Thereto, Including a Rigid Sleeve and a Tube of Thin, Elastic Waterproof Material Rolled from Its End on Itself on to the Sleeve.** J. S. Curtiss, El Paso, Tex.

2,388,323. **Hypodermic Syringe Unit Including a Rubbery Barrel Member and a Detachable, Rubbery Hollow Cap Member.** E. Henderson, New York, N. Y.

2,388,421. **Pneumatic Tire.** H. T. Kraft and F. H. Comey, assignors to General Tire & Rubber Co., all of Akron, O.

2,388,450. **In an Engine Starter, Cushion Members of Material Having Cubical Elasticity.** G. S. Thompson, assignor to Briggs & Stratton Corp., both of Milwaukee, Wis.

2,388,485. **Thermoplastic Adhesive to Unite Separately Formed Airplane Parts.** M. Jensen, Port Washington, assignor to Langley Aviation Corp., New York, both in N. Y.

2,388,525. **Form Constricting and Molding Garment Having Sections of Elastic Material.** F. A. Cohen, Brooklyn, N. Y.

2,388,568. **Bottle Sealing Composition of Pale Crepe and Rock Maple Wood Flour.** N. J. Penning, Milwaukee, Wis.

2,388,635. **Goggles With a Frame of Flexible Plastic Material and a Cushioning Tube of Compressible Material at the Outer Margin of the Frame.** H. M. Ditto, Newton, assignor by mesne assignments to Marine Optical Mfg. Co., Boston, both in Mass., a partnership composed of A., H. M., and E. D. Ditto.

Dominion of Canada

430,790. **Shaft Seal Unit Having a Flexible and Resilient Sealing Member.** Crane Packing Co., assignee of R. D. Snyder, both of Chicago, Ill., U.S.A.

430,834. **Tubular Closure Cap of Resilient Sheet Material.** Shawlock, Inc., Boston, assignee of E. L. Shaw, Brookline, both in Mass., U.S.A.

430,838. **In a Posture Chair, a Tiltable Seat, Pivoted Back, and Balancing Means Consisting of Front and Rear Rubber Biscuits Compressed by the Backward Tilting of the Seat.** Stewart-Warner-Alemite Corp. of Canada, Ltd., Belleville, Ont., assignee of Bassick Co., Bridgeport, assignee of W. F. Herold, Easton, both in Conn., U.S.A.

430,843. **A Formed Threaded Container Cap Shaped by Drawing Metallic Sheeting Coated with Dried Resinous Polymer of Cyclopentadiene.** United Gas Improvement Co., Philadelphia, assignee of N. K. Chaney, Moylan, both in Pa.

430,870. **Container for Gas or Liquid under Pressure, Including a Body of Molded Homogeneous Thermoplastic Flexible and Elastic Material Reenforced by an External Winding of Metal Wire.** H. Davies, London, England.

430,884. **Fluidtight Closure Including a Pair of Flexible Strips of Rubber or the Like Forming Male and Female Members of the Closure.** H. G. Morner, New York, N. Y., U.S.A.

430,888. **Vamp Pad of Fabric Coated with a Rubber or Rubber-Like Material.** L. M. Schacter, Ottawa, Ont.

430,916. **Woven, Electrically Heated Elastic Fabric.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of S. Adamson, Rye, N. Y., U.S.A.

430,956. **Garment Anchor Adapted to Be Worn on the Leg above the Knee and Connected by a Garter or the Like to a Foundation or Like Garment, Including a Band of Fabric Stretchable in Two Directions.** A. Stein & Co., assignee of C. Bullinger, both of Chicago, Ill.

430,958. **Joint Construction Including Inner and Outer Members between Which a Resilient Member Is Compressed.** Thompson Products, Inc., formerly Thompson Products, Incorporated, Cleveland, O., assignee of A. Venditty, Detroit, Mich., both in the U.S.A.

430,992. **Tubular Check Valve Device Including an Elongated One-Piece Tube of Flexible Material.** J. D. Langdon, Brooklyn, N. Y., U.S.A.

431,040. **Detachable Coupling for Electric Cables Including a Pair of Cooperating Contacts Positioned within a Sleeve of Rubber or Similar Material.** W. T. Henley's Telegraph Co., Ltd., Dorking, Surrey, assignee of H. C. Hoban, Dartford, Kent, both in England.

431,051. **Waterproof Fabric Adapted for Use as a Backing for Adhesive Tape.** Johnson & Johnson, Ltd., Montreal, P. Q., assignee of F. N. Manley, Highland Park, and E. P. Wenzelberger, Plainfield, both in N. J., U.S.A.

431,111. **For Imparting Reserve Buoyancy to Water-Borne Craft, an Assembly of Closed Cylinders Full of Air, and Formed of Textile Fabric Coated with an Artificial Organic Water-Resistant Polymer.** H. Dreyfus, assignee of W. H. Moss, both of London, England.

431,118. **Hermetic Closure Including a Pair of Sealing Strips Composed of Waterproof Material.** D. Marinsky and L. H. Morin, both of New York, N. Y., U.S.A.

431,196. **Gasket Including an Annular Body Portion of Compressible Material.** Canadian Westinghouse Co., Ltd., Hamilton, Ont., assignee of R. L. Johnston, Sharon, Pa., U.S.A.

431,208. **Bearing Assembly for a Shaft Member Including a Tubular Member of Fibrous Material Impregnated with a Resinous Binder and a Flexible Seal of Oil Resistant Elastomer Material.** Canadian Westinghouse Co., Ltd., Hamilton, Ont., assignee of J. Boyd and P. R. Eklund, both of Wilkinsburg, Pa., U.S.A.

431,214. **Abrasive Article with a Reenforcing Backing of Layers of Felted Fibers Impregnated with Resin and Secured to the Abrasive Body by Means of a Resilient Tie Bond.** Carborundum Co., assignee of C. E. Wooddell, both of Niagara Falls, N. Y., U.S.A.

431,309. **In a Thrashing Machine, a Rotary Drum, Brackets on the End Walls of the Drum, Bars Having a Resilient Outer Covering Secured to the Brackets, a Casing Surrounding the Drum and Bars Having a Resilient Outer Covering Secured to the Inner Wall of the Casing.** A. D. Clark, Pietermaritzburg, Union of South Africa.

431,410. **In a Hydraulic Accumulator Including a Cylindrical Shell, a Cylindrical Sleeve Mounted within the Shell, and a Piston Slidable in the Sleeve, Sealing Means for the Piston Including a Pair of Piston Rings with Resilient Backing.** New York Air Brake Co., New York, assignee of M. W. Huber, Watertown, both in N. Y., U.S.A.

431,418. **Tobacca Pouch with an Inner Layer of Thermoplastic Rubber Hydrochloride.** Shellmar Products Co., Mount Vernon, O., assignee of I. Gurwick, New York, N. Y., both in the U.S.A.

United Kingdom

572,146. **Bonded Resilient Fibrous Material for Upholstery, Etc.** Xetal Products, Ltd., and L. Appleton.

572,277-278. **Sealing Devices between Rotating and Non-Rotating Members.** F. C. W. Wilkinson and Crane Packing, Ltd.

572,341. **Repair Patches for Inner Tubes and Tire Covers for Vehicle Wheels and for Other Articles of Rubber or Rubberized Fabric.** L. Steiner.

572,683. **Plastic Material for Sealing or Packing Purposes.** F. A. Ross, J. Crawford, and B. B. Chemical Co., Ltd.

572,742. **Inner Tubes for Pneumatic Tires.** Dunlop Rubber Co., Ltd., W. E. Hardeman, and F. J. Armstrong.

PROCESS

United States

2,386,761. **Endless Power-Transmission Belts.** B. W. Wetherbee, assignor to Globe Woven Belting Co., both of Buffalo, N. Y.

2,386,976. **Flattening Curly Polymerized Styrene Sheets.** J. P. Putman, assignor to Reece Button Hole Machine Co., both of Boston, Mass.

TROUBLE-FREE CLUTCH

for Heavy-Duty Drives

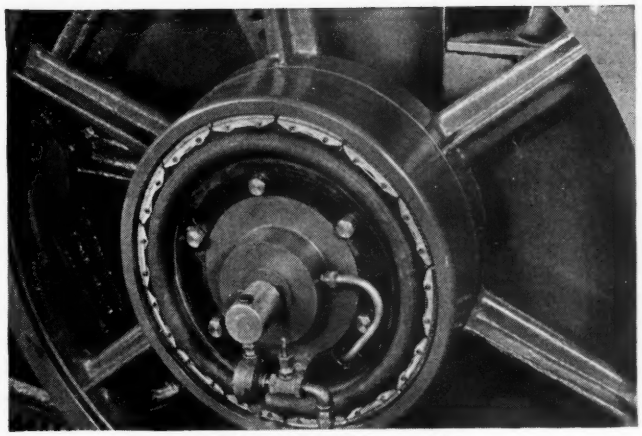
The Fawick Airflex Clutch controls power and torque, and absorbs shocks and vibration, through a cushion of air.

It needs no arms, springs or levers—requires no lubrication or adjustments. There is nothing to get out of order or require frequent replacement. Wear is slow—maintenance is low.

Performance and economy are being proved every day on hundreds of types of heavy-duty drives.

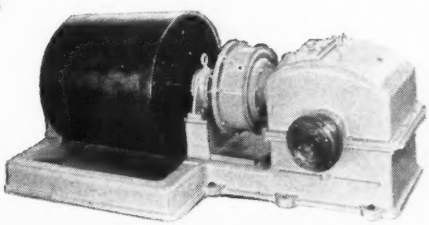
* * *

Fawick Clutches are engineered for the job. Tell us the conditions your equipment must meet and we'll gladly make recommendations. Book on request.

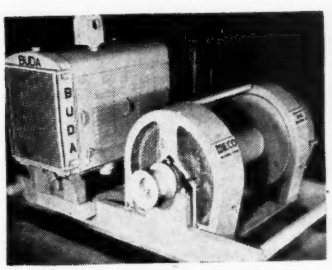


Fawick Airflex Clutch assembly

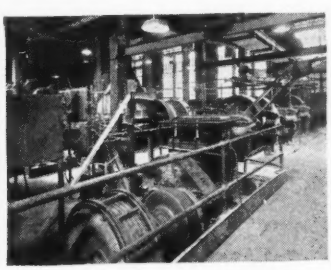
Fawick Clutches are providing new efficiency for shovels, cranes, draglines and hoists.



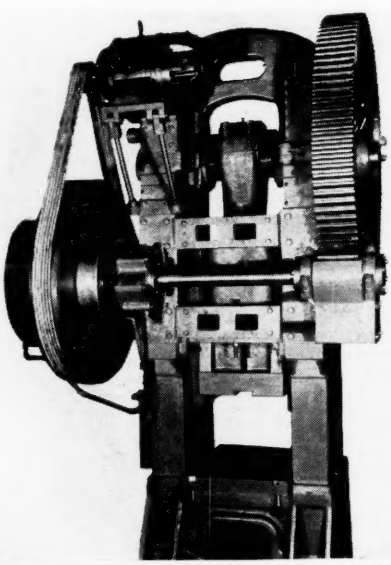
Paper machine drive unit, equipped with moistureproof Fawick Clutch.



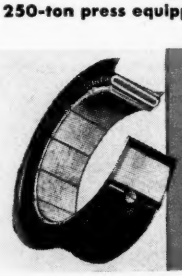
Ideco service winch with Fawick Clutch for drum drive.



Trouble-free Fawick Clutches are finding many applications in the rubber industry, too.



250-ton press equipped with Fawick Clutch and Brake.



FAWICK *Airflex* CLUTCH

FAWICK AIRFLEX CO., INC. • 9919 Clinton Road, Cleveland 11, Ohio

In Canada, Reynold-Coventry Ltd., Montreal, Toronto, Vancouver • In Britain, Crofts Engineers, Ltd., Bradford, England

2,387,498. **Insulating a Metal Article with a Rubber Compound.** T. K. Cox, Randallstown, Md., assignor to Western Electric Co., Inc., New York, N. Y.

2,387,683. **Sheet Material from Resin and Fibers.** H. W. Richter, Bridgewater, and H. R. Gillette, Newton Highlands, both in Mass., assignors to Federal Electric Co., Inc., Chicago, Ill.

2,387,730. **Porous Products from Ethylene Polymer.** W. L. Alderson, Jr., assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,387,801. **Impregnating Cellulose Material with Terpene Hydrochloride.** C. Luckhaupt, Jamaica, N. Y., assignor to Luckite Processes, Inc., Delawanna, N. J.

2,388,297. **Composite Article, Including Extruded Sections, from Synthetic Resinous Thermoplastic.** C. E. Slaughter, New Canaan, assignor to Extruded Plastics, Inc., Norwalk, both in Conn.

Dominion of Canada

430,749. **Shaping Rubber Hydrochloride Material to Form Protective Covering for Hats.** R. J. Weikert, Covington, O., U.S.A.

430,947. **Preparing Moldable Material for Molding.** Reed Prentice Corp., Worcester, assignee of G. Smith, Concord, both in Mass., U.S.A.

431,215. **Colored Heels Molded from Cured Resin and Fibrous Material.** B. B. Chemical Co. of Canada, Ltd., Montreal, P. Q., assignee of T. C. Morris, Medford, Mass., U.S.A.

431,359. **Milling Resinous Homopolymeric Polymethyl Methacrylate.** Canadian Industries, Ltd., Montreal, P. Q., assignee of E. K. Bolton, Wilmington, Del., U.S.A.

431,378. **Softening Natural and Artificial Rubber.** Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., assignee of P. H. Amphlett and D. F. Twiss, both of Birmingham, Warwick, England.

United Kingdom

572,166. **Sponge Rubber Articles.** R. F. McKay. (United States Rubber Co.)

572,258. **Heat Treatment of Natural Resins.** W. A. Mitchell.

572,261. **Filling Molds with Rubber, for Example, in the Manufacture of Articles of Metal and Rubber Bonded Together.** Metalastik, Ltd., W. J. Woodcock, and L. T. Goodman.

572,268. **Plasticizing Vulcanized Rubber Scrap.** Boston Woven Hose & Rubber Co.

572,275. **Rubber Bonded Articles.** Metalastik, Ltd., W. J. Woodcock, and L. T. Goodman.

572,425. **Molding Thermosetting Plastics.** Bakelite, Ltd.

572,599. **Endless Rubber Articles Such as Belts.** Wingfoot Corp.

572,741. **Sticking together Layers of Flexible Sheet Material.** Shawinigan Chemicals, Ltd.

CHEMICAL

United States

2,386,756. **Preserving Freshly Collected Latex by Adding to It Small Amounts of Ammonia and of a Dye from the Class of the Azo, the Nitroso, and the Triphenyl Methane Dyes.** W. D. Stewart, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,386,764. **Synthetic Rubber Latex Prepared by Polymerization of a Butadiene-1,3 Hydrocarbon in an Aqueous Emulsion Containing as Emulsifying Agents a Colloidal Electrolyte and a Truly Water-Soluble and Non-Ionizable Long-Chained Organic Compound from the Class of Polyvinyl Alcohol and Polyether Alcohols.** B. M. G. Zwicker, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,386,769. **Separating a Tertiary Base Olefin from a Hydrocarbon Mixture and Converting It to the Corresponding Tertiary Mercaptan.** D. E. Badertscher, Woodbury, N. J., H. L. Coonradt, Camp Lee, Va., and D. J. Crowley, Penns Grove, N. J., assignors to Socony-Vacuum Oil Co., Inc., a corporation of N. Y.

2,386,770. **Purifying Butadiene Containing a Tertiary Base Olefin as Contaminant.** H. G. Daley, Woodbury Heights, D. J. Crowley, Penns Grove, D. E. Badertscher, Woodbury, both in N. J., and H. L. Coonradt, Camp Lee, Va., assignors to Socony-Vacuum Oil Co., Inc., a corporation of N. Y.

2,386,771-772. **Making a Tertiary Mercaptan from a Tertiary Base Olefin.** D. E. Badertscher, Woodbury, N. J., H. L. Coonradt, Camp Lee, Va., and D. J. Crowley, Penns Grove, N. J., assignors to Socony-Vacuum Oil Co., Inc., a corporation of N. Y.

2,386,773. **Purifying a Tertiary Base Olefin Containing a Non-Tertiary Base Olefin as Contaminant.** D. E. Badertscher, Woodbury, D. J. Crowley, Penns Grove, and C. E. Feasley, Thorofare, all in N. J., assignors to Socony-Vacuum Oil Co., Inc., a corporation of N. Y.

2,386,774. **Selectively Separating a Tertiary Base Olefin Which Is in the Vapor Phase, from a Hydrocarbon Mixture.** D. E. Badertscher, Woodbury, N. J., H. L. Coonradt, Camp Lee, Va., and D. J. Crowley, Penns Grove, N. J., assignors to Socony-Vacuum Oil Co., Inc., a corporation of N. Y.

2,386,793. **Obtaining a Resinous Mass from a Mixture of Substantially Equimolecular Proportions of a Dihydric Alcohol and a Dihydrocarbon Silicon Compound.** W. E. Hanford, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,386,927. **Concentration of Aliphatic Conjugated Diolefin from Hydrocarbon Mixtures Containing the Same.** J. H. Boyd, Jr., Bartlesville, Okla., assignor to Phillips Petroleum Co., a corporation of Del.

2,386,931. **In Producing Synthetic Rubber by Emulsion Polymerization, the Improvement of Creaming the Synthetic Rubber Latex and Subsequently Degassing the Creamed Latex to Remove Volatile Organic Material.** F. T. Carpenter, Dearborn, Mich., assignor to Phillips Petroleum Co., a corporation of Del.

2,386,959. **Stabilizing a Bis(Alkylthiazyl) Disulphide by Treating the Disulphide Dissolved in a Water Immiscible Solvent with a Dilute Aqueous Solution Containing an Alkali Metal Hydroxide.** J. E. Jansen, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,386,968. **Treating a Conjugated Butadiene Polymer Rubber with a Member of the Group of Phosphorus Pentachloride and Phosphorus Pentabromide to Enhance Resistance to Swelling by Organic Solvents.** G. D. Martin, Nitro, Va., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,386,983. **Separating Butadiene from a C_4 Hydrocarbon Mixture.** W. A. Schulze and J. C. Hillyer, Bartlesville, Okla., assignors to Phillips Petroleum Co., a corporation of Del.

2,386,995. **Making Spongy Material from a Plasticized Polyvinyl Chloride.** V. F. Wigal, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,386,999. **Heating at between 100° C. and 250° C. a Fusible Polymer of Diallyl Diglycolate under Sufficient Pressure to Render the Polymer Mass Substantially Coherent.** D. E. Adelson, Berkeley, and H. Dannenberg, assignors to Shell Development Co., both of San Francisco, both in Calif.

2,387,037. **Hard Resinous Light-Colored Composition Formed by Reacting Diphenyl Ether with a Chlorinated Petroleum Wax in the Presence of a Friedel-Crafts Catalyst, Adding Metallic Zinc and Water to Decolorize the Product, and Catalytically Hydrogenating the Product from Treatment with Zinc and Water.** F. P. Otto and O. M. Reiff, both of Woodbury, N. J., assignors to Socony-Vacuum Oil Co., Inc., a corporation of N. Y.

2,387,049. **Resin from a Heated Mixture of Shellac and Urea.** H. H. Bassford, Jr., Brooklyn, assignor to U. S. Shellac Importers Assn., Inc., New York, both in N. Y.

2,387,111. **Composition Including a Vinyl Halide Resin Plasticized with Dicyclopentyl Adipate.** F. A. Bent, Berkeley, assignor to Shell Development Co., San Francisco, both in Calif.

2,387,212. **In Making 2-Amino-Thiazole, the Step of Reacting a Bis(Alpha.Beta-Dihaloethyl) Ether with Thiourea in the Presence of Water.** E. C. Britton and K. G. Harding, assignors to Dow Chemical Co., all of Midland, Mich.

2,387,237. **Catalytic Resin Polymer from a Hydrocarbon Oil Separated from Tar Produced in the Vapor Phase of Pyrolysis of Petroleum Oil.** W. C. Ault, Peoria, Ill., assignor to United Gas Improvement Co., a corporation of Pa.

2,387,256. **Polymerizing a Separately Prepared Permanently Fusible Acid Catalyzed Phenol-Formaldehyde Resin by Heating in the Presence of and Intimately Mixed with a Fusible Melamine-Formaldehyde Resin.** F. J. Groten, Stamford, Conn., assignor to American Cyanamid Co., New York, N. Y.

2,387,259. **Producing Heat-Polymerized Hydrocarbon Resin from a Hydrocarbon Oil Separated from Tar Produced in the Vapor Phase Pyrolysis of Petroleum Oil.** E. L. Hall, Manchester, N. H., and H. R. Batchelder, Drexel Hill, Pa., assignors to United Gas Improvement Co., a corporation of Pa.

2,387,304. **Improving Unstable Oxidized Monocyclic Terpenes by Treating with Hydrogen in Contact with a Nickel Catalyst at between 0 and 90° C.** D. H. Sheffield, assignor to Hercules Powder Co., both of Wilmington, Del.

2,387,338. **Liquid Composition Including Polymerized Chloroprene Dissolved in an Organic Solvent; the Composition Is Resistant to Thickening and Gelling over a Substantial Period of Time and Contains Sodium Sulphanilate.** A. D. Macdonald, Newton, assignor to B. B. Chemical Co., Boston, both in Mass.

2,387,367. **Silicate Base Adhesive Having Dispersed therein a Homogeneous Mixture of a Coumarone-Indene Resin and a Plasticizer for the Resin.** C. A. Vana, Brecksville, O., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,387,385. **Copolymers of a Butadiene and an Alpha Alkyl Acrylonitrile Containing at Least Five Carbon Atoms in the Molecule.** A. M. Clifford, Stow, assignor to Wingfoot Corp., Akron, both in O.

2,387,388. **Product Obtained by Reacting Polyglycol with the Reaction Product of Shellac and Ethylene Glycol.** W. H. Gardner, Bayside, and H. H. Bassford, Jr., Brooklyn, assignors to U. S. Shellac Importers Assn., Inc., New York, all in N. Y.

2,387,393. **Resinous Product as Softener in Coating Compositions Obtained by Reacting a Mixture of Castor Oil, Maleic Anhydride, and Diethylene Glycol.** W. D. Hedges, J. C. Lowman, and T. J. Kerr, assignors to Columbus Coated Fabrics Corp., all of Columbus, O.

2,387,394. **Coated Product with a Flexible Base and a Coating Including a Nitrocellulose Film Forming Constituent and a Plasticizer Which Is the Reaction Product of Castor Oil, Maleic Anhydride, and Ethylene Glycol; the Coating Is Resistent to Weathering and Extremes of Temperature.** W. D. Hedges, J. C. Lowman, and T. J. Kerr, assignors to Columbus Coated Fabrics Corp., all of Columbus, O.

2,387,395. **Patent Leather Including a Flexible Base and a Coating Which Consists of a Nitrocellulose Film Forming Constituent, Pigment, and a Plasticizer, and over This a Second Coating of Varnish or Enamel; Each Coating Includes a Plasticizer Which Is the Reaction Product of Castor Oil, Maleic Anhydride, and Diethylene Glycol.** W. D. Hedges, J. C. Lowman, and T. J. Kerr, assignors to Columbus Coated Fabrics Corp., all of Columbus, O.

2,387,396. **Upholstery Fabric Material Including a Fabric Base and a Flexible Coating Consisting of the Evaporation Residue of a Mixture of Nitrocellulose, Plasticizing Resin Consisting of a Condensation Product of Castor Oil, Maleic Anhydride, Glyclo, and a Condensation Product of Castor Oil, Diethylene Glycol and Maleic Anhydride, Pigment, and Solvent.** W. D. Hedges, J. C. Lowman, and T. J. Kerr, assignors to Columbus Coated Fabrics Corp., all of Columbus, O.

2,387,424. **Wrinkle Varnish Coating Composition.** W. A. Waldie, Oakwood, O., assignor to New Wrinkle, Inc., Wilmington, Del.

2,387,435. **Aromatic Orthodinitrile.** M. H. Fleysher, Buffalo, N. Y., assignor to Allied Chemical & Dye Corp., a corporation of N. Y.

2,387,481. **Improving the Processing Characteristics of Butadiene-Styrene Interpolymers by Incorporating o-Sulphobenzoic Anhydride.** J. R. Vincent, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,387,498. **In a Method of Insulating a Metallic Article with Rubber, the Application of an Intermediate Coating of a Rubber Antioxidant from the Group of Butyraldehyde-Aniline Condensation Product, Diphenylamine Acetone Reaction Product, Phenyl-Alpha Naphthylamine and a Mixture of Diphenyl-Para-Phenylene with Phenyl-Alpha-Naphthylamine.** T. K. Cox, Randallstown, Md., assignor to Western Electric Co., Inc., New York, N. Y.

2,387,499. **An Isobutylene-Diolefin Polymer Having a Molecular Weight within the Range of 10,000 to 250,000, in Combination with a Molecular Weight Protective Agent Including Para-Hydroxy Phenyl Morpholine.** W. J. Daly, Brooklyn, N. Y., assignor to Jasco, Inc., a corporation of La.

2,387,502. **New Plastic Composition Consisting of a Synthetic Rubber and a Rubber-Like Vulcanizable Oil-Resistant Plastic Obtained by Heating a Rubber with a Crude Aryl Phosphine Halide.** P. M. Downey, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,387,517. **Method of Copolymerizing a Compound of the Formula $R{=}CH_2$, Where R Is an Aliphatic Radical, with an Unsaturated Hydrocarbon, Which Includes Contacting a Mixture of the Materials with a Compound of the Formula MXmRn, Where M Is of the Class of Aluminum, Gallium and Boron, X Is a Halogen, R Is a Monovalent Hydrocarbon Radical, m and n Each Represent an Integer from 1 to 2 Inclusive, and $m{+}n{=}3$.** C. A. Kraus, Providence, R. I., assignor by mesne assignments to Jasco, Inc., a corporation of La.

2,387,518. **Stabilizing a High Molecular Weight, Substantially Saturated Linear Polymeric Hydrocarbon by Including an Organic Stabilizing Compound Containing a Thiocarboxyl Function.** I. E. Lightbown, Roselle, and W. J. Sparks, Elizabeth, both in N. J., assignors by mesne assignments to Jasco, Inc., a corporation of La.

2,387,521. **Modified Product of an Intimate Mixture of Rubber and an Organic Phosphine Halide, in Which an Aromatic Polynuclear Hydrocarbon Is the Modifying Agent.** G. D. Martin, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,387,530. **Modifying the Properties of Linear, Active Hydrogen-Containing Macromolecular Polymers Containing Recurring Intralinear Carbonamide and Carboxylic Acid Esters by Reacting with the Cyclic Anhydride of an Organic Dicarboxylic Acid Having an Acyclic Chain of at Least Four Carbon Atoms between the Carboxyl Groups.** W. W. Prichard, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,387,543. **Polymerization of Olefinic Ma-**

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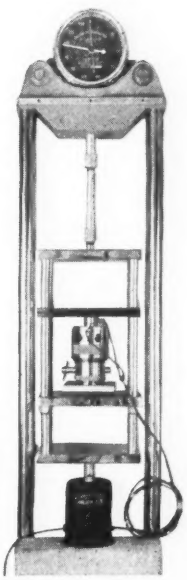

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2,387,571. **Heat Stable Compositions Consisting of a Solid High Polymer Halogen-Containing Substance from the Class of Chloro Rubber, Polyvinyl Chloride, Chlorinated Polyvinyl Chloride and Polymeric As-Dichloroethylene, and Alkaline Substance and an Alcohol.** H. Fikentscher, Ludwigshafen-on-Rhine, and R. Roehm, Troisdorf-Oberlar, both in Germany; vested in the Alien Property Custodian.

2,387,624. **Copolymer of Methyl Cyclopentadiene and Cyclopentadiene.** S. G. Trepp, Swarthmore, Pa., assignor to United Gas Improvement Co., a corporation of Pa.

2,387,626. **Coating Composition for Metal Including a Wax-Like Material, and a Benzene-Soluble Resinous Polymer of a Material Having as the Only Resin-Forming Content One of a Group of (a) Cyclopentadiene and (b) Cyclopentadiene Mixed with Methyl Cyclopentadiene.** A. L. Ward, Drexel Hill, Pa., assignor to United Gas Improvement Co., a corporation of Pa.

2,387,662. **Safety-Type Glass Interlayer Including a Polyvinyl-Butyral Resin with the Tri-Butylidene of Sorbitol.** W. H. Holst, Tamaqua, Pa., assignor to Atlas Powder Co., Wilmington, Del.

2,387,723. **Diolefins.** H. Dreyfus, London, England, assignor to Celanese Corp. of America, a corporation of Del.

2,387,781. **Low-Boiling Diolefin Hydrocarbons.** J. G. Allen, Forest Hills, N. Y., assignor to Phillips Petroleum Co., a corporation of Del.

2,387,755. **Hydrogen Modified Polymers of Ethylene.** W. E. Hanford, Easton, Pa., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,387,773-774. **Hot-Melt Coating Composition Consisting of Cellulose Acetate Butyrate, an Antioxidant, and a Mixture of Dibutyl Sebacate and Butyl Stearate.** M. Salo and H. F. Vivian, assignors to Eastman Kodak Co., all of Rochester, N. Y.

2,387,784. **Polymerization of Normal Olefins.** R. M. Thomas, Union, N. J., and H. C. Reynolds, Jr., Belmont, Mass., assignors to Standard Oil Development Co., a corporation of Del.

2,387,833. **Water Insolubilizing a Water-Soluble Solid Polyvinyl Alcohol.** J. Dahle, West Newton, assignor by mesne assignments to Prophy-lac-tic Brush Co., Northampton, Mass.

2,387,834. **As Vulcanization Accelerator for Rubber, the Condensation Product Obtained by Fusing a Mercaptoarylthiazole, Cyanamide, and a Formaldehyde Polymer.** A. R. Davis, Riverside, Conn., assignor to American Cyanamid Co., New York, N. Y.

2,387,836. **Alpha, 4-Dimethyl Styrene from a Bicyclic Terpene.** J. K. Dixon, Riverside, Conn., assignor to American Cyanamid Co., New York, N. Y.

2,387,895. **Preparing a Synthetic Resin by Continuously Flowing a Mixture of a Diene Hydrocarbon and an Unsaturated Glyceride Oil at a Pressure from 60 to 120 Pounds per Square Inch through a Tube Heated to Obtain a Temperature from 200 to 450° C.** H. L. Gerhart, Milwaukee, Wis., assignor to Pittsburgh Plate Glass Co., Pittsburgh, Pa.

2,387,931-934. **Unsaturated Esters and Polymers thereof.** I. E. Muskat and F. Strain, both of Akron, O., assignors to Pittsburgh Plate Glass Co., Pittsburgh, Pa.

2,387,967. **Tabbing Cement Including as a Base a Water Emulsion of Polyvinyl Acetate and a Plasticizer to Which Is Added a Polyhydroxy Alcohol from the Class of Glycol and Glycerol.** H. Zimmerman, St. Louis, Mo.

2,387,992. **Preparing Butadiene Essentially Free from Water in the Same Fractionator Wherein Butadiene Is Separated from Less Volatile Hydrocarbons.** K. H. Hachmuth, Bartlesville, Okla., assignor to Phillips Petroleum Co., a corporation of Del.

2,388,035. **Linear Polyamides.** C. J. Frosch, Summit, N. J., assignor to Bell Telephone Laboratories, Inc., New York, N. Y.

2,388,037. **Making Rubber Cement from a Mixture of Rubber, Cyclized Rubber, Channel Black, and Solvent.** S. L. Brams, Dayton, O., assignor to General Motors Corp., Detroit, Mich.

2,388,041. **Separating Butadiene from a Mixture of Butadiene and Isobutylene while Preventing the Formation of Polymeric Material.** D. Craig, Silver Lake, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,388,078. **Conversion of Normal Butane to Butadiene.** E. D. Reeves, Cranford, N. J., assignor to Standard Oil Development Co., a corporation of Del.

2,388,086. **Resinous Condensation Product from Gyoxal Heated with an Aqueous Solution of an Acyclic Ketone Having a Reactive Methylene Group.** J. B. Rust, Verona, N. J., assignor to Montclair Research Corp., a corporation of N. J.

2,388,095. **Segregating Iso-Olefins from Gases Containing Them.** E. E. Stahly, Baton Rouge, La., assignor by mesne assignments to Jasco, Inc., a corporation of La.

2,388,099. **Producing a Mixture of C_4 Hydrocarbons Containing a High Proportion of Butylenes.** C. K. Viland, Martinez, and H. Y. Hyde, Associated, assignors to Water Associated Oil Co., San Francisco, all in Calif.

2,388,100. **Terpene-Type Hydrocarbons.** E. F. Wadley, Baytown, Tex., assignor to Standard Oil Development Co., a corporation of Del.

2,388,138. **Polymerization of Ethylene in the Presence of a Catalyst from the Group of Oxygen and Peroxy Catalysts.** C. H. Greenewalt, Greenville, assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, both in Del.

2,388,160. **Fractionation of Solid Polymers of Ethylene.** N. W. Krase, Swarthmore, Pa., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,388,167. **Improving Yield and Characteristics of the Product of Copolymerization in Aqueous Emulsion of Butadiene-1,3 Hydrocarbons with Monomeric Olefinic Compounds by Conducting Copolymerization to Substantial Completion in the Presence of an Alpha.Beta-Unsaturated Aldehyde Containing from Four to Five Carbon Atoms and a Tertiary Carbon Atom in Alpha Position.** K. E. Marple, Oakland, assignor to Shell Development Co., San Francisco, both in Calif.

2,388,169. **Curing an Interpolymer of Ethylene and an Organic Monocarboxylic Acid Ester of Vinyl Alcohol.** A. McAlevy, D. E. Strain, and F. S. Chance, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,388,178. **Polymerizing Ethylene by Subjecting It to Elevated Temperatures and Pressures in the Presence of Polymerization-Favoring Quantities of Free Oxygen, Water, and in The Presence of an Alkali, and at a pH Higher Than 7.** M. D. Peterson, Edgemore Terrace, Del., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,388,218. **Nitriles.** J. F. Olin, Grosse Ile, Mich., assignor to Sharples Chemicals, Inc., Philadelphia, Pa.

2,388,225. **Polymerizing Ethylene in an Aqueous Menstruum, at a pH in the Range of 7-11, in the Presence of an Alkali Persulphate Polymerization Catalyst in the Absence of a Dispersing Medium and a Reagent Capable of Maintaining the pH between 7 and 11.** R. E. Brooks, Wilmington, M. D. Peterson, Edgemoor Terrace, and A. G. Weber, assignors to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, both in Del.

2,388,236. **Cyclo Pentamethylene Thiocarbamyl Piperidyl Sulphide.** R. H. Cooper, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,388,238. **Insolubilizing a Solid Polyvinyl Alcohol.** J. Dahle, West Newton, Mass., assignor by mesne assignments to Pro-phy-lac-tic Brush Co., Northampton, Mass.

2,388,278. **Separation of the Polyamide Resulting from the Polymerization of Hexamethylene Diamine and Adipic Acid from the Solid Reaction Mass Obtained from the Completion of the Polymerization.** R. W. Moncrieff, and E. W. Wheatley, Spondon, England, assignor to Celanese Corp. of America, a corporation of Del.

2,388,318. **Polydecamethylene Dihydromuconate That Can Be Drawn into Fibers Showing Crystalline Orientation along the Fiber Axis.** C. J. Frosch, Summit, N. J., assignor to Bell Telephone Laboratories, Inc., New York, N. Y.

2,388,319. **Infusible, Insoluble Polymer Produced by Curing with an Organic Peroxide, a Fusible Micro-Crystalline Dihydroxy Aliphatic Hydrocarbon-Dicarboxy Aliphatic Hydrocarbon Polyester.** C. S. Fuller, Chatham, N. J., assignor to Bell Telephone Laboratories, Inc., New York, N. Y.

2,388,326. **Moistureproof Coating Composition Including Finely Divided 1,2-Dihydronaphthalene Polymer.** W. L. Hyden and J. A. Mitchell, Kenmore, N. Y., assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,388,346. **Composition Including a Rubber from the Group of Natural Rubber and Rubber-Like Polymers of Butadiene, Isoprene, Piperylene, and 2-Chlorobutadiene, and a Hydrocarbon Resin Polymer.** F. J. Soday, Swarthmore, Pa., assignor to United Gas Improvement Co., a corporation of Pa.

2,388,372-373. **Heavy Metal Catalysts for the Addition Polymerization of a Monomeric Material Including a Conjugated Butadiene.** W. D. Stewart, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,388,410. **Ketone Resins.** V. E. Haury, El Cerrito, assignor to Shell Development Co., San Francisco, both in Calif.

2,388,440. **Pyrolyzing a Beta-Chloroallyl Ester of the Type Corresponding to $CH_3CR_2(OCO.CH_3).COO.CH_2CCL:CH_2$ Where R_2 Is from the Group of Hydrogen and Methyl, under Suitable Conditions of Time and Temperature to Produce the Corresponding Acrylate.** C. E. Rehberg, Wyndmoor, and C. H. Fisher, Abington, Pa., assignors to United States of America as represented by C. R. Wickard, Secretary of Agriculture, and his successors in office.

2,388,477. **Polymerizing in Aqueous Emulsion a Butadiene-1,3 Hydrocarbon in the Presence of a Compound Containing a Monovalent Aryl Group Attached to a Carbon Atom of a 2-Thiothiazyl Group.** C. F. Fryling, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,388,506. **Removing Hydrocarbon Impurities from Nitriles of the Class of Propionitrile Normal Butyronitrile, and Iso-Butyronitrile.** J. W. Teter, Chicago, Ill., assignor to Sinclair Refining Co., New York, N. Y.

2,388,507. **Dehydration of Water-Contaminated, Saturated Nitriles of Three to Four Carbon Atoms per Molecule.** J. W. Teter and W. J. Merwin, both of Chicago, Ill., assignors to Sinclair Refining Co., New York, N. Y.

2,388,514. **Polymerizing in Aqueous Emulsion a Butadiene-1,3 Hydrocarbon in the Presence of a Compound of the Formula:**

$$R—(S)n—X$$

Where X Is a Thiazyl-2-Radical, n Is an Integer from 1 to 4, and X Is a Monovalent Organic Radical, Other Than R, Having Its Monovalency on a Carbon Atom. B. M. G. Zwicker, Akron, O., and W. D. Stewart, Yonkers, N. Y., assignors to B. F. Goodrich Co., New York, N. Y.

2,388,515. **Polymerizing in Aqueous Emulsion a Butadiene-1,3 Hydrocarbon in the Presence of a Compound Containing an Alkyl Group Attached to a Ring Carbon Atom of a 2-Thio-Arylenethiazyl Group.** B. M. G. Zwicker, Akron, O., and W. D. Stewart, Yonkers, N. Y., assignors to B. F. Goodrich Co., New York, N. Y.

2,388,562. **As Rubber Preservative, a Mixture of a Compound of the Formula $A—CH_2—R'$ Where A Is a Secondary Amino Group in Which the Free Valence Belongs to the Amino Nitrogen, and R' Is an Aromatic Group of Which One to Two Members Consist of Oxy and Amino Radicals Substituted on the Aromatic Ring Attached to the CH_2, and a Different Secondary Diaromatic Amine; Compound and Amine Are Devoid of Strongly Negative Groups of the Character of —COOH, $—SO_3H$ and $—NO_2$ Groups.** A. M. Neal and J. R. Vincent, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,388,600. **Stable Aqueous Emulsion Made by Emulsion Polymerization, from a Normally Liquid Monomeric Vinyl Compound.** H. M. Collins, Shawinigan Falls, assignor to Shawinigan Chemicals, Ltd., Montreal, both in P. Q., Canada.

2,388,601. **Coarse-Grained Suspension of a Polyvinyl Ester.** H. M. Collins, Shawinigan Falls, assignor to Shawinigan Chemicals, Ltd., Montreal, both in P. Q., Canada.

2,388,602. **Aqueous Emulsion of a Polyvinyl Ester.** M. Kiar, Shawinigan Falls, assignor to Shawinigan Chemicals, Ltd., Montreal, both in P. Q., Canada.

2,388,613. **An Elastomer Which Is the Product of the Thermal Reaction of Water-Insoluble Ethyl Cellulose, at Least One Normally Solid, Crystalline Substituted Polyphenyl Hydrocarbon, and a Hydrogenated Higher Fatty Acid Glyceride.** H. Keller, assignor to Monsanto Chemical Co., both of St. Louis, Mo.

2,388,618. **Composition Including Rubber and a Plasticizing Proportion of a Neutralized Phosphated Castor Oil.** M. Omansky, Brookline, Mass., assignor by mesne assignments to Victor Chemical Works, Chicago, Ill.

2,388,651. **Producing Rubber Hydrochloride by Passing Hydrogen Chloride Gas into Rubber in a Solution Containing Naftolen in Which Is Present a Catalyst.** La V. E. Cheyney, assignor to Wingfoot Corp., both of Akron, O.

2,388,656. **Paint Compositions Including a Solution of a Condensation Derivative of Rubber, a Drying Oil, and a Small Amount of Organic Diisocyanate.** J. G. Lichty, Stow, and N. V. Seeger, Cuyahoga Falls, assignors to Wingfoot Corp., Akron, all in O.

2,388,657. **Alpha.Beta Unsaturated Acid Halides.** J. R. Long, Stow, assignor to Wingfoot Corp., Akron, both in O.

2,388,660. **The Class of Propiolyl Halides Consisting of the Chloride, Bromide, and Iodide.** F. C. Schaeffer, Greenwich, Conn., assignor to Wingfoot Corp., Akron, O.

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430,775. **Raising the Softening Point, Increasing the Notch-Bend Resistance, and Improving the Flexibility of Ethylene Polymer by Blending with a Polymer Which Is Elastic, Stretchable, and Retractable on Release of the Stretching Force.** Canadian Industries, Ltd., Montreal, P. Q., assignee of G. H. Latham, Wilmington, Del., U.S.A.

430,780. **In the Manufacture of Vinyl and Ethylidene Esters, the Improvement of Reacting Acetylene and a Carboxylic Acid in the Presence of a Compound of a Pentavalent Atom of the Group of Nitrogen, Phosphorous, Arsenic and Antimony, Wherein Four Valences Are Satisfied by a Linkage to Carbon, and the Fifth by an Anion.** Canadian Industries, Ltd., Montreal, P. Q., assignee of F. O'N. Cockerille, Waynesboro, Va., U.S.A.

430,781. **Treating an Acetone-Soluble Polyvinyl Butyral Resin to Render It Insoluble in Acetone.** Canadian Industries, Ltd., Montreal, P. Q., assignee of G. S. Stamatoff, Rutherford, N. J., U.S.A.

430,782. **Copolymer of an Ester of an Alpha Methylene Monocarboxylic Acid with a (2-Vinylethinyl) Carbinol.** Canadian Industries, Ltd., Montreal, P. Q., assignee of D. D. Coffman, Wilmington, Del., and C. E. Dencon, Toledo, O., both in the U.S.A.

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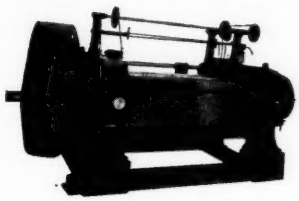

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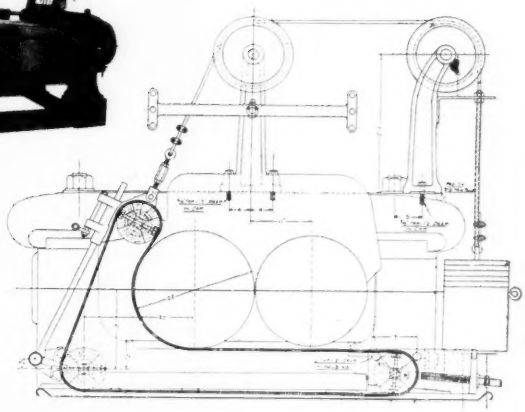

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merizate of a Polyvinyl Aryl Compound. Canadian General Electric Co., Ltd., Toronto, Ont., assignee of G. F. D'Alelio, Pittsfield, Mass.

430,904. **Water Insoluble Aminated Polymerizate of a Polyvinyl Aryl Compound.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of G. F. D'Alelio, Pittsfield, Mass.

430,960. **Treating Cured Spongy or Porous Rubber with an Aqueous Emulsion of a Mineral Oil to Soften and Swell It.** United States Rubber Co., New York, N. Y., assignee of D. R. Kemble, Mishawaka, Ind., both in the U.S.A.

431,003. **Electrical Insulating Material from Phenol and Formaldehyde.** H. Stager, Zurich, Switzerland.

431,023. **Dielectric Composition Consisting Essentially of Halogenated Diphenyl and a Nitrated Polynuclear Aryl Hydrocarbon.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of F. M. Clark, Pittsfield, Mass., U.S.A.

431,048. **Composition for Use in Continuous Process for Preparing Sheet Rubber, Containing an Aqueous Latex Curd Suspension, and Small Amounts of Sulphonated Pine Oil and Acid Stable Sulphonated Rosin.** Institute of Paper Chemistry, assignee of B. W. Rowland and D. Fronmuller, all of Appleton, Wis., U.S.A.

431,155. **Improving the Dehydration of 1,3-Butylene Glycol to Produce 1,3-Butadiene.** Air Reduction Co., Inc., New York, N. Y., assignee of R. C. Tollefson, Stamford, Conn., U.S.A.

431,156. **1,3-Butadiene by Dehydration of 1,3-Butylene Glycol.** Air Reduction Co., Inc., New York, N. Y., assignee of A. E. Lorch, Tenafly, N. J., U.S.A.

431,213. **Vinyl Resin Stabilized by Triphenyl Tin Hydroxide.** Carbide & Carbon Chemicals, Ltd., Toronto, Ont., assignee of V. Yngve, Highland Park, N. J., U.S.A.

431,218. **Lustrous Filaments, Threads, Etc. from Polyvinol Alcohol.** Courtaulds, Ltd., London, assignee of D. L. Wilson, Coventry, both in England.

431,226. **Thiazyl Sulphur Halides.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of W. E. Messer, Cheshire, Conn., U.S.A.

431,227. **As Rubber Accelerator, a Composition Including Tetra Butyl Thiuran Monosulphide, a Butyl Thiourea, and a Butyl Urea.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of A. J. Laliberte, Naugatuck, Conn., U.S.A.

431,229. **Improving the Anti-Flex-Cracking Property of Rubber by Incorporating in a Vulcanizable Rubber Compound a Dihydroxy Substituted Diphenyl Wherein Both Hydroxyl Groups Are Attached to the Same Phenyl Nucleus.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of R. T. Armstrong, New York, N. Y., and E. J. Hart, Cedar Grove, N. J., U.S.A.

431,230. **Ammonium Dithiocarbamate.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of S. D. Shinkle, Passaic, N. J., U.S.A.

431,239. **Chewing Gum Material Including Hydrogenated Rosin and a Low-Grade Natural Rubber-Like Material from the Group of Gutta Percha, Jelutong, Balata, Etc., and Chicle Gum.** Hercules Powder Co., assignee of J. M. Schantz, both of Wilmington, Del., U.S.A.

431,240. **Chewing Gum Base Including a Polyhydric Alcohol Ester of Hydrogenated Rosin.** Hercules Powder Co., assignee of J. M. Schantz, both of Wilmington, Del., U.S.A.

431,241. **Chewing Gum Material Including a Pentaerythritol Ester of a Material from the Group of Rosin, Hydrogenated Rosin, and Polymerized Rosin.** Hercules Powder Co., assignee of J. M. Shantz, both of Wilmington, Del., U.S.A.

431,242. **Chewing Gum Material Including Paraffin Wax, Crepe Rubber, Water, a Maleic-Modified Polyhydric Alcohol Ester of Hydrogenated Rosin, Ester Gum, Cumarone-Indene Resin, and Beeswax.** Hercules Powder Co., assignee of J. M. Schantz, both of Wilmington, Del., U.S.A.

431,260. **Bubble Gum Including Cumarone Resin, Rubber, Prolamine, and Plasticizer.** Prolamine Products, Inc., Dover, Del., assignee of American Maize Products Co., New York, N. Y., assignee of H. M. Weber, Chicago, Ill., all in the U.S.A.

431,294. **Filaments, Foils, Etc., Which Dissolve in Water and Have as Basis a Partially Saponified Polyvinyl Acetate Containing between 2% and 12% of Vinyl Acetate Radicles.** H. Dreyfus, London, assignee of R. P. Roberts, E. B. Johnson, and H. H. Taylor, all of Spondon, both in England.

431,355. **Molecularly Oriented Copolymer Which Exhibits a Characteristic Crystalline X-Ray Diffraction Pattern, Including the Cold-Drawn Product of Polymerization of a Mass Containing from 40 to 80% of Acrylonitrile and at Least One Itaconic Ester.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of G. F. D'Alelio, Northampton, Mass., U.S.A.

431,357. **Waterproofing a Fabric with Isothiocyanate.** Canadian Industries, Ltd., Montreal, P. Q., assignee of W. E. Hanford and D. F. Holmes, both of Wilmington, Del., U.S.A.

431,363. **Interpolymer of Methylene Dimethacrylate and Methyl Methacrylate.** Canadian Industries, Ltd., Montreal, P. Q., assignee of H. J. Richter, Wilmington, Del., U.S.A.

431,364. **Moistureproof Sheet Wrapping Material Including a 12% Solution in Toluene of 10 Parts Wax, 90 Parts Cyclized Rubber, and Two Parts Tetraethyl Diamino Diphenyl Methane.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. A. Mitchell, Kenmore, N. Y., U.S.A.

431,369. **Resinous Aldehyde Condensation Products Containing Melamine.** Ciba Products Corp., Dover, Del., U.S.A. assignee of Society of Chemical Industry in Basle, Basel, assignee of W. Fisch, Binningen, both in Switzerland.

United Kingdom

572,133. **Vulcanizable Compositions.** Standard Oil Development Co.

572,134. **Preservation of Latex.** United States Rubber Co.

572,135 **Articles from Aqueous Dispersions of Rubber.** United States Rubber Co.

572,136. **Synthetic Linear Polyamides.** E. I. du Pont de Nemours & Co., Inc.

572,148. **Rubber-Like Polymers.** Wingfoot Corp.

572,197. **Modified Butadiene Acrylonitrile Copolymers.** Wingfoot Corp.

572,206. **Coating Compositions Containing Polyvinyl Acetal Resins.** E. I. du Pont de Nemours & Co., Inc.

572,230. **Organo-Silicon Resinous Materials.** British Thomson-Houston Co., Ltd.

572,232. **Aqueous Dispersions of Rubber and Resin.** United States Rubber Co.

572,239. **Melamine-Aldehyde Resins.** British Industrial Plastics, Ltd.

572,245. **Molding Powders.** E. I. du Pont de Nemours & Co., Inc.

572,265. **Polymeric Material.** E. I. du Pont de Nemours & Co., Inc.

572,272. **Resinous Polymerization Products.** British Thomson-Houston Co., Ltd.

572,279. **Soft Synthetic Rubber-Like Masses.** Monsanto Chemical Co.

572,298. **Trichloropropionitrile.** Wingfoot Corp.

572,301. **Synthetic Resinous Materials.** American Cyanamid Co.

572,410. **Styrene from Ethyl Benzene.** Distillers Co., Ltd., H. M. Stanley, and F. E. Salt.

572,423. **Removal of Resinifying Constituents from Gases containing Hydrocarbons.** J. Savary.

572,602. **Methyl Pentadienes.** Shell Development Co.

572,634. **Plasticization of Rubber.** Dunlop Rubber Co., Ltd., D. F. Twiss, A. J. Hughes, and P. H. Amphlett.

572,637. **Production of Acetone and Butyl Alcohol by Fermentation.** C. Weizmann.

572,645. **Ketones.** C. Weizmann.

572,670. **Synthetic Plastic Materials.** Distillers Co., Ltd., J. J. P. Staudinger and H. M. Hutchinson.

572,671. **Rubber-Like Substances.** J. R. Whinfield and W. K. Birtwistle.

572,695. **Pulverulent Polythenes and Dispersions Produced therefrom.** C. F. Flint, R. B. F. F. Clarke, and Imperial Chemical Industries, Ltd.

572,706. **Self-Lubricating Compositions Containing Rubber-Like Substances.** Dunlop Rubber Co., Ltd., G. W. Trobridge, G. C. Brentnall, and D. N. Simmons.

572,720. **Synthetic Rubber Compositions.** Shell Development Co.

572,738. **Polymeric Materials.** D. A. Harper and Imperial Chemical Industries, Ltd.

572,747. **Treatment of Felt and Products Obtained thereby.** Dunlop Rubber Co., Ltd., J. Rogerson, and F. W. Warren.

572,753. **Vulcanization of Rubber.** H. W. K. Jennings.

MACHINERY

United States

2,386,966. **Apparatus for Injection Molding and High-Frequency Electrostatic Heating of Plastic Material.** H. F. MacMillin, Mount Gilead, O., assignor to Hydraulic Development Corp., Inc., Wilmington, Del.

2,387,566. **Device for Adhering Plies of Thermoplastic Material.** J. Custers, Gladbach-Rheydt, Germany; vested in the Alien Property Custodian.

2,387,650. **Strip Material Cutter.** E. A. Davis, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,387,718. **Film Extruder.** C. E. Coleman, Buffalo, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,387,876. **A Two-End Slitter for Fabrics.** O. L. Bright, Indianapolis, Ind., assignor to United States Rubber Co., New York, N. Y.

2,388,652. **Apparatus for Stitching Valve Stems to an Extruded Inner Tube.** E. D. George and M. Lammertse, assignors to Wingfoot Corp., all of Akron, O.

Dominion of Canada

430,749. **Apparatus to Form Protective Coverings for Hats from Rubber Hydrochloride Material.** R. J. Weikert, Covington, O., U.S.A.

430,833. **Collapsible Mold.** Rubatex Products, Inc., New York, N. Y., assignee of H. Pfleumer, New Brunswick, N. J., both in U.S.A.

430,970. **Tire Curing Apparatus.** Wingfoot Corp., assignee of H. A. Freeman, both of Akron, O., U.S.A.

431,228. **Apparatus for Making Lengths of Tubular Stock.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. T. Smith, St. Clair Shores, Mich., U.S.A.

United Kingdom

572,204. **Means for Dealing with Plastics of the Thermoplastic and Thermosetting Groups for Delivery to Extruder and Other Machines.** Bridges & Co., Ltd., and J. Brown.

UNCLASSIFIED

United States

2,387,320. **All-Textile, Highly Stretchable Yarn.** B. H. Foster, Maplewood, N. J., assignor to United States Rubber Co., New York, N. Y.

2,387,335. **Treating Ferrous Metal Stock to Increase Its Rubber-Adherent Characteristics.** W. E. Leonard, Worcester, Mass., assignor to American Steel & Wire Co. of New Jersey, a corporation of N. J.

2,387,448. **Dummy Air Hose Coupling.** S. L. Joiner, Sweetwater, Tex.

2,387,726. **Porous, Hardened Filtering Medium for Separating the Liquid Constituents from the Gum Constituents of Latex.** J. M. Garriga, assignor to Corporation Peruana del Amazonas, both of Lima, Peru.

2,387,114. **Means for Lubricating the Tread of Automobile Tires to Reduce Friction between Tread and Road Surface.** M. B. Boyce, Haverhill, Mass.

2,388,153. **Lubricant Mixture for Molds Used in Molding Rubber.** H. H. Jones, Birmingham, Ala., assignor to Hugh Jones Products Co., a corporation of Ala.

Dominion of Canada

430,852. **Cord for Pneumatic Tires.** H. Dreyfus, London, assignee of T. Jackson, D. Finlayson, and T. B. Frearson, all of Spondon, both in England.

430,987. **Securing a Thermoplastic Printing Plate to a Metallic Backing.** C. E. Boutwell, Birmingham, Ala., U.S.A.

431,074. **Machine for Assembling a Tire Locking Ring to a Wheel Rim.** Studebaker Corp., assignee of A. H. Rerick, both of South Bend, and E. B. Rausch, Bremen, both in Ind., U.S.A.

431,325. **Hose Coupling.** J. D. Luebkeman, Libertyville, Ill., U.S.A.

United Kingdom

572,225. **Devices for Securing Removable Flanges to Vehicle Wheels.** Dunlop Rubber Co., Ltd., and H. J. Butler.

572,398. **Electric Cable Stripper.** Dorman & Smith, Ltd., and T. Atherton.

TRADE MARKS

United States

417,057. **Hartolan.** Emulsifying agent, plastifier for rubber and synthetic rubber. Croda Ltd., Goole, England.

417,075. **Princess Alice.** Footwear. Kirsch-Blacher Co., Inc., New York, N. Y.

417,093. **Tapemaster.** Roll holder and cutter for use in dispensing adhesive tape, etc. Kendall Co., Walpole, Mass.

417,128. Representation of a ticket with rain pouring from a black cloud in the corner; the words: **"Rain Checks,"** are on the ticket. Raincoats. Weathercraft Co., New York, N. Y.

417,130. **Patch.** Elastic collar clasps or holders. A. C. Patch, Topeka, Kans.

417,134. Representation of a man on a work bench and above the words: **"Joseph Handcraft Originals".** Footwear. I. N. Joseph, Chicago, Ill.

417,150. **Yankee Ramblers.** Footwear. N. A. Laveson, doing business as United Shoe Co., Philadelphia, Pa.

417,151. **Yankee Freedoms.** Footwear. N. A. Laveson, doing business as United Shoe Co., Philadelphia, Pa.

417,152. **Yankee Pal.** Footwear. N. A. Laveson, doing business as United Shoe Co., Philadelphia, Pa.

417,176. **VulMaster.** Vulcanizing machine. Stenor Inc., Stamford, Conn.

417,181. **The Foundation of a Nation.** Foundation garments. Peter Pan Foundations, Inc., New York, N. Y.

EUROPE

GREAT BRITAIN

Report of R.A.B.R.M.

The annual general meeting of the Research Association of British Rubber Manufacturers was held in London on September 19, when Sir Harold Hartley was reelected president for the ensuing year. Except for H. Evans, who resigned because of ill health, all the vice presidents were also reelected, as well as the following members of the council, due to retire by rotation: Major O. W. H. Briggs, Major J. H. Mandleberg, W. J. S. Naunton, A. S. Roberts, and W. T. Simpson. Members representing sectional interests follow: J. Entwisle, A. W. Fletcher, H. W. Franklin, and E. C. Lacey; coopted member: H. C. Street (Rubber Trade Association).

At an earlier meeting on September 12, Lt. Col. J. Sealy-Clarke had been unanimously reelected chairman of council. In his annual report on the activities of the Association during 1944, the chairman brought out that investigations on the utilization of GR-S and other synthetic rubbers occupied first place in the year's program.

Some of the details of the work on GR-S published in the Association's twenty-fifth annual report covering 1944 were discussed by P. Schidrowitz in his Views and Reviews.[1] He considers one of the most interesting sections that dealing with variability of GR-S and quotes the result of an investigation of the extent of variability as between products from the same plant and between products from different plants:

"The largest source of (apparent) variability is that introduced by the experimental mixing and testing technique, so that repeat tests on a blended test of GR-S may give just as variable results as tests on different batches."

It seems that even after the elimination of this difficulty a real variation between batches, even from the same plant, remained. It was further definitely established that the products of certain plants consistently differ from those of others.

Regarding "tack" in GR-S, the studies at Croydon revealed that the common practice of immersion in hard water to cool stocks destroys completely whatever tackiness the GR-S may have had originally.

[1] **India Rubber J.**, Oct. 27, 1945, p. 11.

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When hard lumps appear during calendering it is a pretty sure sign that the surface temperature of the rolls is too high and you are scorching the rubber . . . somebody guessed wrong. But why guess and spoil good rubber? You can accurately, quickly and conveniently check the surface temperatures of still and moving rolls with the Cambridge Roll Pyrometer. Write for descriptive bulletin.

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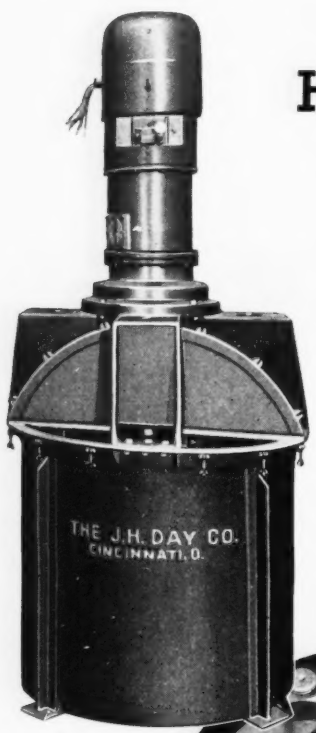
DAY Rubber Cement Mixer

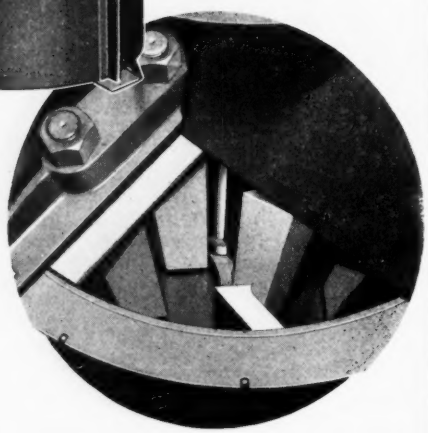
Hero Type



USED EXTENSIVELY IN RUBBER PLANTS THROUGHOUT THE COUNTRY

BELOW

INTERIOR VIEW SHOWING HEAVY AGITATOR BLADES



The DAY Hero Rubber Cement Mixer requires much less time for dissolving a batch than does the older type of mixer. Four sets of stationary blades, spaced at 90 degrees, extend downward from the top frame. Two sets of blades, spaced at 180 degrees, extending upward from heavy agitator arms located at the bottom of vertical shaft, rotate with the shaft.

The lower picture shows the blade section of the DAY Rubber Cement Mixer, illustrating the close clearance between the stationary and the moving blades, which shear the rubber into smaller and smaller pieces, constantly exposing more surface to the action of the solvent.

THE J. H. DAY COMPANY

CINCINNATI 22 OHIO

The work on aging of GR-S led to the important conclusion that it is a mistake to assume that the stiffening and hardening of GR-S in aging are due simply to after-vulcanization. It is apparently suspected that oxidation may be here involved, and whether and to what extent this is indeed the case is now under investigation.

The program of new fundamental research includes in the first place work on rheological properties as a function of the constitution and configuration of long-chain polymers. These properties are of vital practical importance since they determine the processing behavior of the unvulcanized material.

The study of resilience in relation to high-speed deformation (especially impacts), important for articles like tires, for instance, has already been started. A critical survey has been made of existing methods of measuring resilience, and the effect of temperature over a wide plus to minus range on the resilience of various synthetics and natural rubber has been investigated. Critical minima were found to exist which differ according to the type of rubber, test conditions, and the nature of the compounding ingredients.

British Rubber Industry Notes

The control of giant-sized part-worn and retreaded tires (including worn inner tubes) and of the retreading of such tires has been abolished, effective November 1, 1945. At the same time solid rubber tires, both new and part-worn, were also decontrolled. All other new tires and new giant-sized inner tubes are still controlled.

Sir A. Vyvyan Board was released from his appointment as Rubber Controller by the Ministry of Supply on November 1, 1945. On that date too Rubber Control was replaced by a Rubber Directorate under J. Riddell and a Tire Directorate under H. J. Holmes.

The reorganized aviation department of Dunlop Rubber Co., Ltd., is now located at the Coventry works of the company. The section is under the management of J. Wright, who has been connected with it from the start.

A. Lakeman, who as architect to Dunlop Rubber had a hand in the construction of Fort Dunlop and designed various important buildings for the company, has retired after 27 years' service. One of Mr. Lakeman's most important undertakings was the Dunlop factory at Buffalo, N. Y., construction of which was completed within 12 months, thereby breaking more than one world's record.

Lord Colwyn has resigned as director of the board of Dunlop Rubber, and has been succeeded by the Hon. David Bowes Lyon, brother of the Queen.

Cosmer Rubber Estates, Ltd., probably the first British postwar rubber planting enterprise, was registered at the end of September, 1945. The new concern, which has a capital of £10,000 in shares of 1s each, plans to grow rubber and nuts. The subscribers are R. J. Palmer, press manager, and G. E. Henning, rubber planter.

British Industrial Plastics, Ltd., Birmingham, expanded its business of making tools, molds, presses, and other equipment for the manufacture of plastics and allied materials to such an extent during the war that it decided to form a separate, wholly-owned subsidiary to take over this department. The new concern, known as B. I. P. Tools, Ltd., was registered on October 5, 1945, with a capital of £100,000 in £1 shares. The directors are F. H. J. Mills, S. A. Goode, S. White, C. S. Dingley (director of British Industrial Plastics), and K. M. Chance (managing director of British Industrial Plastics).

Two new rubber manufacturing companies were also recently registered: Lea Bridge Rubber Works, with capital of £20,000 in £1 shares, is to acquire the rubber manufacturing business of Lea Bridge Industries, Ltd. Bolton Rubber Mfg. Co., Ltd., capitalized at £20,000 in £1 shares, will manufacture and deal in rubber, synthetic rubber, rubber substitutes, and plastics.

J. F. Gleason, formerly manager of the cashier's department of the Goodyear Tire & Rubber Co., Akron, O., recently arrived in England to take over his new position at Wolverhampton as general operating manager and assistant to P. H. Sullivan, secretary, of Goodyear Tire & Rubber Co., Ltd.

The regional production boards, which during the war were chiefly concerned with munitions production, have now been reconstructed by the president of the Board of Trade as regional boards for industry to cover the whole field of productive industry. There will be 11 boards altogether

including one for the Wales region and one for the Scotland region. Each board will consist of an impartial chairman, three representatives of employers and trade unions, and the senior regional representative of the Board of Trade, Admiralty, Ministries of Labor and National Service, Supply and Air-Craft Production, Food, Fuel and Power, Town and Country Planning, War Transport, Works, and in Scotland, the Scottish Office.

The boards will advise Ministers on industrial conditions in the regions and, when necessary, on steps to be taken to promote fuller use of regional resources in productive capacity or labor. In addition they will inform industry on government policy as it relates to industry and report to headquarters the views of local industry.

FRANCE

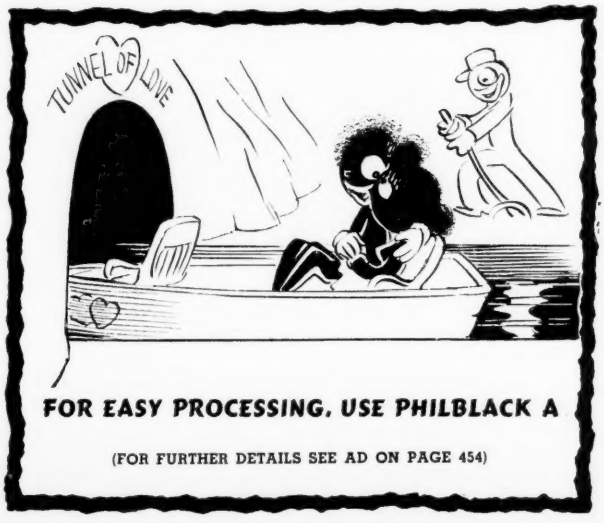
The problem of public transportation in France is still acute despite reported increases in the manufacture of tires. According to an English source, output of tires has been advancing rapidly from 960 tons in April to 1,600 tons in September; for January, 1946, 2,200 tons are expected. That transportation has not shown a comparable improvement is laid to the fact that most of the tires produced have been diverted to civil and military priorities, leaving practically nothing for motor buses. But an easing of the situation was looked for toward the end of the year following the assurance of the Minister of Industrial Production that 500 tires were to be set aside monthly for the motor bus service. Even so, the transportation difficulty will be a long way from complete solution since it is admitted that it would require 6,000 tons of tires a month to meet all needs.

The French branch of the Dunlop Rubber company has doubled its capital to 350,000,000 francs, by the issue of 350,000 shares of 500 francs each, to holders of 1,000 francs. Later on the company will offer 200,000,000 francs in bonds to finance reconstruction of its plant which suffered severely by air bombardment. Damages are estimated between 500,000,000 and 600,000,000 francs, of which the state will reimburse 70%. Reconstruction of the plant has advanced to the stage where 30% of former output is possible; it is hoped that prewar production capacity will be attained in the coming year. The company reported a business loss for 1944 of 10,947,000 francs, which brings the total loss booked to 61,551,000 francs.

An indication of the work on rubber with which French investigators have been occupied in the war period is gained from abstracts of some of the articles that have appeared in French periodicals during 1944 and 1945.

In an article on standardization of latex, P. Compagnon[1] suggests that in order to insure constant quality, simple

[1] Rev. gén. Caoutchouc, 21, 211-12 (1944).



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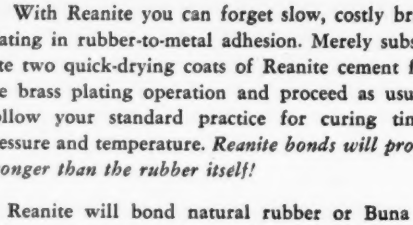

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and rapid means of determining the characteristic properties of latex must be developed and that the cooperation of producers must be enlisted to correct the causes of variation in the quality of latex.

H. Leduc and R. Dufour[2] have continued their work on the utilization of high-frequency electric current in the manufacture of rubber goods. One of their latest experiments concerns the use of high-frequency currents to concentrate latex. M. Deribere[3] tested infra-red rays to dry latex and reports excellent results on thin films, with a flux in the neighborhood of 10,000 to 20,000 A. units.

In making hollow goods from latex, A. Jarrijon[4] works with molds of plaster instead of metal. This process, which makes use of the possibilities of absorption of water by the plaster, requires the use of flocculated latex. F. Chaissang's[5] method of molding articles from latex, first used in the production of gas masks, involves the sensitizing of the latex and avoids the subsequent removal of the sensitizing agent and of washing operations.

M. Favier's[6] article on the transportation and sale of latex reveals that Liverpool and Le Havre are the only ports in Europe equipped to handle latex shipped in bulk. All exports of rubber from Liberia, he adds, are in the form of latex.

Starting out from the assumption, based on earlier investigations, that oxidation of rubber takes place with simultaneous formation of peroxides which then evolve and yield oxidation products, J. Le Bras[7] represents schematically the main reactions capable of taking place and suggests that the role of the antioxygens is not that of deactivators, but of deviators.

In a review[8] of the world's paint and varnish industry since 1940, mention is made of a non-tacky resin obtained by dissolving rubber in melted colophony and treating the mixture with a metallic oxide—ZnO, CaO or MgO.

To judge by the abstracts available, thio rubbers have been receiving much attention in France. The problems connected with processing these rubbers, combining them with natural rubber or Buna or both; the effect of the addition of stearine or fatty bodies and of different types of carbon blacks, are treated by F. Chevassus.[9]

In another article,[10] it is shown that X-ray studies of ethylene polysulphides and of polychloroisoprenes make it possible to adduce exact information regarding the mechanism of the vulcanization of synthetic rubbers.

Elsewhere[11] the structure of thio rubbers is discussed. Pure ethylene polysulphide at rest is amorphous; when it is stretched, it presents an attractive diagram of fibers which persists even after cessation of traction. The elementary particle is orthorhombic, and the dimensions are: a=8.57 A.U.; b=5.0 A.U., and c=4.27 A.U.

[2] **Ibid.**, 21, 250-52 (1944).
[3] **Ibid.**, 22, 16-17 (1945).
[4] **Ibid.**, 21, 238 (1944).
[5] **Ibid.**, 21, 260 (1944).
[6] **Ibid.**, 21, 209-11 (1944).
[7] **Ibid.**, 21, 243-45 (1944).
[8] **Chimie des Peintures**, 8, 163-65 (1945).
[9] **Rev. gén. Caoutchouc**, 22, 28-32 (1945).
[10] **Ibid.**, 22, 37 (1945).
[11] **C. R. Acad. Sciences**, 219, 395-97 (1944).

HOLLAND

The Holland branch of the Dunlop Rubber Co., taken over by the Germans soon after their invasion of the country, was operated by them throughout the occupation. According to a report by B. G. Wood, manager of the Dutch company until May, 1940, during his visit in Holland last summer he learned that while the Germans had confiscated all the tires they could find, the three key members of the branch left in Holland were able to hide various things such as electrical bookkeeping machines, typewriters, internal telephones, tire racks, four cars, and many of Mr. Woods' personal belongings, and did this so cleverly that the Germans never found them. Mr. Wood, who was with Dunlop South Africa, Ltd., in Durban, during the last years of the war, is now reorganizing the Dutch company. While in Holland last year, he was appointed official liaison delegate to the Netherlands Tire Syndicate and advisory member of the board.

R. Houwink, director of the Rubber-Stichting (Rubber Foundation) at Delft, at present visiting in the United

Building Where Quarters of Rubber-Stichting Are Housed

States, recently explained to INDIA RUBBER WORLD how this organization, in which the scientific, technical, and propaganda activities of the Dutch rubber growers have been centered, could continue its work almost without hindrance from the Germans during the war although these activities were of no use whatsoever to the German total warfare.

Before the war the Rubber Foundation had made plans to have its own buildings, but the outbreak of the war interfered with these plans, and instead it was decided to rent the right wing of the building shown in the accompanying illustration.

It was evident that propaganda activities had to be discontinued during the war, but research work was continued, and during the first year the Germans left the institute undisturbed. It was feared, however, that as soon as the Germans should "discover" the institute, the staff would be sent to Germany, since research on natural rubber was not of any importance to the German war program. In the beginning of 1943, the institute was indeed "discovered", Dr. Houwink said, and a very serious situation arose. The Rubber Foundation succeeded, after some very trying negotiations, in convincing the Germans of the need of establishing a Plastics Institute in the Netherlands in these "days of substitutes" and pointed out that the rubber research workers were well equipped for such an undertaking. Some publications on plastics had been prepared in earlier years and could be used to advantage in supporting the claim, which was further borne out by a number of public and private organizations.

In this manner the staff of the Rubber Foundation was saved from forced labor in Germany, and it is also of equal importance to know that using the "Plastics Institute" as a screen, the staff was able to continue its research work on rubber at about 80% of capacity. Consequently the whole organization has remained intact and is resuming its work at full capacity.

The Plastics Institute is still in existence, but will soon be transferred to another organization. During the period of transition, Dr. Houwink will continue his leadership of the Plastics Institute.

RUSSIA

It is now about 15 years since the Russians began to cultivate the variety of rubber-yielding dandelion known as *kok-saghyz*, and it is natural to expect that definite advances have been made in Russia in methods of exploiting the plant. In a recent issue of the *India Rubber Journal*, Prof. A. I. Kuptsov, of Tomsk University in Siberia, gives some new information on the subject. While the natural habitat of the plant is the foothills of the Tian Shan Mountains in Central Asia, it was soon discovered that *kok-saghyz* thrives and yields better in a more temperate climate; consequently before long the southern districts of White Russia and the northwestern regions of the Ukraine became the chief centers of cultivation. Meanwhile, however, it had also been found that areas in southeastern Siberia were suited to growing *kok-saghyz*—a fortunate

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discovery that was promptly made use of when the Germans invaded the Ukraine, cutting the Russians off from the plantations there. Immediately commercial plantations of several thousand acres were established at various points in Siberia, and by 1943 several hundred thousand acres had been planted up. When the Ukraine was liberated, *kok-saghyz* growing activities were again transferred to this region.

The experience of the Russians has shown that for maximum rubber yields, a cool moist long summer is necessary; this point has been proved in practice by the fact that Canada with its longer, moister, and cooler summers has reported better harvests than either the U.S.S.R. or the United States.

Various methods of improving yields have been tested. Thus the Narymsk Selection Station in Siberia obtained some success with a method of lengthening the vegetation period by planting in July and gathering the crop in the fall of the following year. Apparently the next step will be to try to develop a variety that does not bloom after the young plant has wintered in the open, but produces a big healthy root, as in the case of fall beets.

Another procedure, successfully followed at Tomsk University, is to plant in June seedlings started from seed sown in hothouses in April. Big roots, rich in rubber, are said to be obtained in this way, but the procedure is found to be too laborious unless the seedlings are planted mechanically.

Siberian investigators have also found that the rubber content of roots increased when they were stored until spring in cellars at temperatures which were slightly above 0° C.

The work just described has been carried out in Siberia to meet the special conditions prevailing there. But Professor Kuptsov states that his investigations at Tomsk University not only form the basis of Siberian experiments in seed selection, but of all other parts of the U.S.S.R. where *kok-saghyz* is grown.

Two methods deserve special mention. In the one case *kok-saghyz* is propagated from seed collected in the second year of the plant's life when the weak-rooted plants die or flower poorly and automatically fall out as sources of seed, thus making it certain that seed is gathered only from the sturdier plants. Or specimens with the best roots are selected in the fall, replanted, and cultivated especially for their seeds. Selection has been aided by the discovery that the best plants have partite leaves and did not bloom during the first year. This method of selection is claimed to result in rapid increase in the size of *kok-saghyz* roots; as an indication of its success, we are told that recently selected specimens had roots which weighed more than 30 grams.

Heating and Vulcanizing

(Continued from page 507)

sales may be realized by a cheaper product, a better product, or a sales slogan which will arouse the imagination of the market.

The cost of various-size units can easily be obtained from the manufacturers. Figure 8 will show the per hour operating cost of standard-size units. These operating costs are broken down into the cost of power, amortization, and tubes. Figure 9 shows the same thing in a little different way—the dollar cost per radio frequency kilowatt hour according to the size of the generator being used. These figures likewise are broken down into the cost of power, amortization, and tubes.

It is far too early to attempt to predict accurately how broad an application this process will have in the rubber industry. There are applications where the advantages are obvious, and it is for these items that first applications will be made.

Viewed from a position of considerable advantage, it is clear that the immediate application to some products is here—the application to practically all items to be molded or vulcanized is only a matter of time.

Editor's Book Table

BOOK REVIEWS

"Advancing Fronts in Chemistry. Volume I. High Polymers." Edited by Sumner B. Twiss. Reinhold Publishing Co., 330 W. 42nd St., New York, N. Y. Cloth, 6 by 9 inches, 196 pages. Price $4.

This book offers a compilation of a series of lectures presented during a symposium on high polymers at Wayne University in the Spring of 1944. It represents an attempt to correlate recent and diverse experimental data in order to develop fundamental theories for further work.

The first three chapters serve as an introduction and foundation to the chemistry of high polymers. "Molecular Structure and Mechanical Behavior of High Polymers," by Herman F. Mark reviews the classification and structural principles of rubbers, plastics, and fibers. Samuel S. Kistler discusses "The Relation between Structure and Physical Properties of High Polymers," and Edgar C. Pitzer writes on "Some Applications of Catalysts to Hydrocarbon Reactions of Importance in the Synthesis of High Polymers."

The logical sequence in the development of fundamental concepts is adhered to in succeeding chapters. Those by Charles C. Price on "Some Aspects of the Mechanism of Addition Polymerization," and by Frank R. Mayo on "Polymerization as a Study of Reactions of Free Radicals" review evidence for the free radical mechanism of addition polymerization. "Molecular Size Distribution in High Polymers," by Walter H. Stockmayer, and "Effect of Chain Length on Physical Properties of Cellulose Derivatives," by Emil Ott, present a discussion of the importance of chain length and size distribution.

The geometry of long-chain molecules and the effect of inter-molecular forces, as determined by X-ray diffraction studies, are presented in detail in "Nature of the Solid State of Chain Polymers," by William O. Baker. The study of mechanical properties in concentrated solution as a new approach to the problem of orientation and mobility of chain polymers in the liquid state is considered by John D. Ferry in "Mechanical Properties of Concentrated Solutions of High Polymers." "Some Concepts of Textile Fibers," by Milton Harris, presents some of the practical work accomplished with natural fibers, such as silk, cotton, and wool, and draws analogies between fibers and rubbers.

Although a rather high level of physical chemistry is maintained throughout, the book is eminently readable and not unnecessarily abstruse owing, perhaps, to the original lecture presentation of the material. Principles and theories propounded are clarified by the use of many diagrams and charts and by adequate references to the literature. A comprehensive index is appended.

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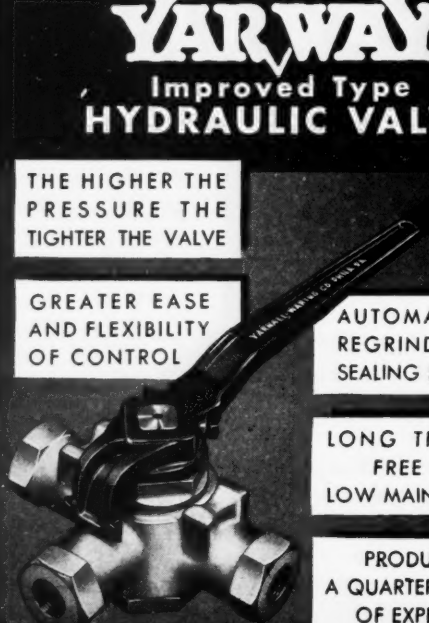

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"Carbon Black Manual." Witco Chemical Co., New York, N. Y. Cloth, loose-leaf, 6 by 9 inches. 66 pages. Illustrations.

This profusely illustrated booklet was written to summarize current ideas on carbon blacks. It is especially useful in view of the many recent developments in application and in the industry itself. The booklet starts with a discussion and listing of the physical and fundamental properties of Witco blacks, and ensuing chapters go on to review the use of carbon blacks in rubbers, paints, inks, plastics, paper, concrete, and miscellaneous products in the light of current practice and recent advances.

Of special interest are the two chapers concerned with a general survey and detailed applications of carbon blacks in rubber. In the general survey, the use of blacks in both natural rubber and in GR-S, GR-I (Butyl), and GR-M (Neoprene GN) synthetic rubbers. Many charts are used to bring out the dependence, to a large degree, on carbon black particle size and structure of such rubber properties as modulus, tensile strength, tear resistance, rebound, heat build up, hardness and plasticity. References are included to previous reports in the literature.

The chapter on applications discusses the company's individual rubber blacks from the point of view of their use in specific rubber products. In addition are practical carbon black formulations for GR-I tubes and GR-S tubes, carcasses, and treads showing changes in physical properties of the vulcanizates with variation in curing cycles.

"World Rubber and Its Regulation." K. E. Knorr, Stanford University Press, Stanford University, Calif. Cloth, 6 by 9 inches. 274 pages. Illustrations. Index. Price, $3.

At this time when both national and international policy on rubber for the future is being made, this book by Dr. Knorr should be most welcome not only to the policy makers, but also to those both in and out of the industry who feel they would like to review the past, present, and possible future situation with a view to offering their comments, when and if governmental action is to be taken. The author is associate economist in Stanford University's Food Research Institute who published a series of articles in INDIA RUBBER WORLD during 1943 on "Rubber after the War."

As stated in the preface, "the world rubber economy is in a period of upheaval and transition" and it is useful to analyze the presumable effects of new developments and the adjustments necessitated by them. The main focus of the book, however, is on controls—especially on international control arrangements. The Stevenson Scheme of 1922 through 1928 and the International Rubber Regulation Agreement of 1934 through 1943 are examined in considerable detail, and the author can find little to say in their favor. It is pointed out that as a basic standard in economic as well as political affairs, the general public interest must dominate over the conflicting interests of any special group.

Following detailed and comprehensive surveys of rubber supply between two wars, trade and uses, economic characteristics of the rubber market and the above-mentioned regulation schemes, future trends are examined in chapters on post-war consumption, supplies and competition, major problems of United States policy, and problems of international regulation. In the final chapter suggestions are offered as a contribution toward a program designed to satisfy the minimum requirements of an expanding and adaptive world economy and yet to mitigate the pains of necessary adjustments. The buffer-stock scheme is also discussed in detail.

Useful tables on rubber exports, imports, and prices are found in the appendix, and a bibliography is also included.

"The Technology of Plastics and Resins." J. Philip Mason and Joseph F. Manning. D. Van Nostrand Co., Inc., 250 Fourth Ave., New York, N. Y. Cloth, 6 by 9 inches, 500 pages. Price $6.50.

This book, based on a Boston University course in the chemistry of plastics and resins, is an attempt to provide an adequate introduction to both the chemistry and the practical utilization of plastics and resins.

The book is divided into three sections. The first section, consisting of six chapters, reviews the basic chemical fundamentals and theories, explains the terms used, types and mechanisms of polymerization, and discusses the relation between various physical properties and structure. The second section, of 13 chapters, discusses the more

important resins and plastics in terms of methods of preparation, properties, and uses. Materials presented include rubber, cellulose, phenolics, amino aldehydes, cellulose derivatives, acrylics, polystyrene, the vinyl group, alkyds, protein plastics, and synthetic rubbers. The third section, composed of six chapters, contains information on fabricating techniques, including compounding, molding, mold design, casting, laminating, and coating methods.

Of special interest are the two chapters in the second section that deal with natural and synthetic rubbers. That on natural rubber presents a rather comprehensive summation covering the structure, methods of coagulation, and utilization of latex. Milling, compounding, and fabrication methods of solid stock are reviewed, and there are sections on elasticity, relaxation, and hysteresis, with emphasis placed on their relation to structure. The chapter on synthetic rubbers gives a brief history of research in this field and devotes sections to a discussion of the structure, methods of polymerization, compounding, vulcanization, and properties of the important industrial synthetic rubbers. A general chart comparing the different types is included, together with two manufacturing flow sheets on the rubbers prepared from calcium carbide and from ethylene.

A brief discussion of silicone resins is given in an appendix and makes some mention of silicone rubbers and liquids.

This book is a comprehensive survey of the plastics field and should be quite valuable from both a theoretical and practical standpoint. Many illustrations are included, together with explanatory diagrams and handy reference tables for each group of plastics. Each chapter has an appendix of review questions emphasizing the important points contained therein. An adequate index is included.

NEW PUBLICATIONS

"Management Engineering Counsel." Associated Engineers, Inc., Fort Wayne, Ind. 8 pages. Listed are the fields of consultant service offered by the company. Service is available in many branches of business administration, industrial engineering, architectural design and structural engineering, and general counsel. Work in business administration includes general management counsel, preparation of audit and wage stabilization reports, and appraisals and valuations. In industrial engineering, service covers production planning, materials and inventory control, job evaluation, incentives, plant layout, and quality and waste control. Photographs of key personnel are given together with descriptions of their qualifications and experience.

"Drastic Price Reductions on Sharples Ethylamines Open New Research and Industrial Fields." Sharples Chemicals, Inc., Wyandotte, Mich. 4 pages. This bulletin announces new reduced prices for monoethylamine, diethylamine, and triethylamine. Physical properties of these products are given, together with information on shipping containers and quantities. There are also lists of present and suggested uses of the chemicals, including applications in the rubber industry.

"Corrosion-Resistant Masonry." Bulletin 810. The U. S. Stoneware Co., Akron, O. 52 pages. This bulletin describes the company's corrosion-resistant cements, putty and calking compounds, acid-proof bricks and constructional shapes, and impervious membranes. Physical property charts, resistance characteristics, and many diagrams on applications are given. Neoseal, a tacky, self-adhering rubber sheet for sealing, and Tygon, Resilon, and rubber impervious membranes are among the rubber-like materials described. Many constructional reference tables are included.

"Bob Considine Leaves Europe Behind . . . and Gets a Peek at the Future." United States Rubber Co., Rockefeller Center, New York 20, N. Y. 12 pages. This is the first of a series of booklets on subjects pertinent to the present and future of American aviation. This article by Bob Considine of the International News Service concerns his trip to the United States from the European Theatre of Operations by way of Pan-American Clipper and emphasizes the role of the airplane in postwar life.

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"**Spray Nozzles** for Water Cooling, Air Conditioning, and for General Industrial Uses." Bulletin N-616. Yarnall-Waring Co., Chestnut Hill, Philadelphia 18, Pa. 16 pages. This bulletin describes the company's spray nozzles made in involute and fan-spray types. Design data and nozzle capacity charts are included as well as many illustrations of industrial nozzle applications.

Bulletins of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. "**Neoprene Type S.**" BL-202. 4 pages. A new neoprene well suited for the manufacture of crepe soles is described. Properties, coloring ingredients, and a typical formulation are given. The elastomer possesses inherent toughness and resistance to breakdown and thermal softening. "**Aquarex L Paste.** A Corrosion Inhibiting Mold Lubricant." BL-204. 4 pages. This is a new chemical for use as a mold lubricant and as a detackifier for uncured elastomers. It can advantageously replace Aquarex D solution owing to its corrosion resistance. The chemical is also suggested for use on steel drier belts in synthetic rubber plants.

"**Plastics Newsfront.**" Fall, 1945. American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y. 20 pages. This is the first issue of an external house magazine dealing with applications of molding compounds, resin adhesives, and laminating resins. This illustrated booklet contains articles on the use of Melmac plastic for mining machinery insulation and for Army Medical Corps mess trays. One article treats of the use of Urac adhesives for bonding target bows, and another of their use in shipping boxes suitable for severe shipping and weather conditions and for shipment of perishable goods such as seafood. The use of Laminac plastic for braces and frames in Navy radar installations is described, and there is a short review of Beetle plastic used for molding teeth and gums for practice by dental students. In addition is a section on plastics design with illustrative diagrams.

"**Cabot Carbon Black Industrial Highlights.**" Godfrey L. Cabot, Inc., Boston, Mass. 16 pages. This is the first in a series of graphical presentations on the manufacture of carbon black and its relation to the rubber, paint, lacquer, ink, and paper industries. Many illustrations are presented on the structure of carbon black, various processing operations, and industrial applications. There is also a section on employes' working conditions and company housing developments.

"**Custombuilt Latex and Resin Compounds.**" General Latex & Chemical Corp., Cambridge, Mass. 16 pages. The company's natural latex, natural prevulcanized latex, synthetic latex, and synthetic resin products are described. Some illustrations and a comprehensive list of industrial applications are given, which include adhesives, coatings, dipped goods, impregnations, and others. The work of the laboratory in research, development, factory control, and service is illustrated.

"**R. D. Wood Co. Catalog.**" R. D. Wood Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa. Loose leaf. Rubber and plastics equipment, 25 pages. The numerous single-, and multiple-opening hydraulic and hydroelectric presses, together with various types of belt presses, are described on these pages. Information includes a listing of specifications for each press and a brief description of important constructional features. Each press is illustrated.

"**Hevea Rubber Culture in Latin America.**" R. D. Rands. Reprinted from "Plants and Plant Science in Latin America." The Chronica Botanica Co., Waltham, Mass. 22 pages. This is a revision of a series of three articles published under the same title in INDIA RUBBER WORLD for June, July, and August, 1942. The procedure for fostering a rubber growing industry in Latin America is presented, together with a discussion of problems under investigation in the cooperative intergovernmental program. The work of the rubber research stations is described, and recommendations are given for further test work on the development of resistant, high-yielding clones. The section on results obtained in test work with clones has been revised and brought up to date. Recommendations on future test work have been revised in the light of recent achievements in the research program.

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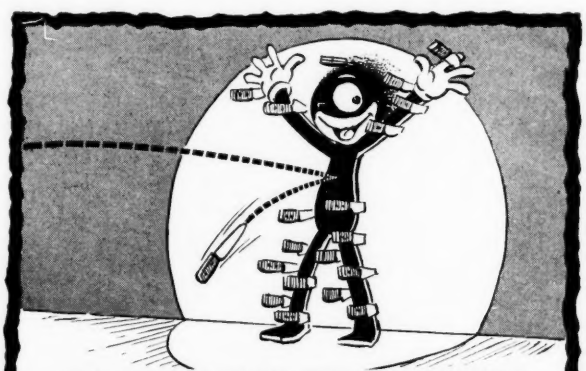


FOR CUT AND CRACK GROWTH RESISTANCE USE PHILBLACK A

(FOR FURTHER DETAILS SEE AD ON PAGE 454)

Regular and Special Constructions of

COTTON FABRICS

Single Filling **Double Filling**

and

ARMY

Ducks

HOSE and BELTING

Ducks

Drills

Selected

Osnaburgs

Curran & Barry

320 BROADWAY

NEW YORK

Market Reviews

COTTON & FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

	Oct. 27	Nov. 24	Dec. 1	Dec. 8	Dec. 15	Dec. 22
Futures						
Jan. ..	23.68	24.17	24.47	24.48	24.67	24.45
Mar. ..	23.76	24.02	24.30	24.59	24.78	24.65
May ..	23.75	23.85	24.19	24.43	24.72	24.58
July ..	23.60	23.62	23.92	24.13	24.48	24.39
Sept. ..	23.34	23.19	23.38	23.61	23.81	23.73
Oct.		22.98	23.12	23.35	23.48	23.41
Dec. ..	23.13	22.87	23.03	23.25	23.36	23.31

INCREASED hedge selling and profit taking in the market during December tended to hold its upward trend in check. The firmness of the market was apparently due to the improved outlook for exports, increasing domestic consumption in the early months of this year to meet pressing consumer demand, and the realization that the harvested crop may not be sufficient to meet even domestic requirements. On the other hand liquidation and profit taking were stimulated by the advances in the market and the uncertainty over final outcome of efforts being made to revise the current parity formula so as to include farm labor, along with unsettled labor conditions in numerous industries and further widening of the breach between market prices and government selling prices.

The price of February futures opened at 24.38c on December 1, the low point for the month, fluctuated until it rose to 24.72c on December 15, then closed at 24.47c on January 2.

The 15/16-inch spot middling price ranged from a low of 24.97c on December 1 to 25.33c on December 15. It closed at 25.23c a pound on January 2.

Another factor inspiring the market was reports concerning low-grade cotton. The automobile industry is said to be interested in securing 300,000 bales of low-grade cotton for various uses on a basis competitive with the better qualities of linters. Also the CCC was considering a proposal that low-grade cotton be shipped out of its holdings on a consignment basis. Most encouraging was the news about plans to export several million bales of cotton, including a plan of the State and War departments to push sales of 500,000 to 700,000 bales of low-grade cotton to Japan.

CCC loans continue to lag with entries through December 1 totaling approximately 126,000, compared with 1,213,000 bales for a similar period in 1944. The Bureau of Census reported ginnings to December 13 at 7,733,761 running bales, compared with 10,532,396 a year ago; and with harvesting weather continuing unfavorable, it is feared that much cotton will be left in the fields.

The CCC announced that it will offer about one million bales of its best stock during the first week of January. This is expected to ease the tight situation somewhat although the trade doubts that there is very much desirable cotton in CCC holdings.

Fabrics

The dormant character of the market continued through December, with most houses completely adhering to withdrawn positions. The trend toward integrated mill operations continued making gray goods increasingly difficult to obtain. Apparently this tight situation will remain until set-aside orders and distribution controls are clarified for the first quarter of 1946.

The tremendous demand for sheetings is going unfilled, and it is felt that rubber manufacturers will have to get along on a very short supply for some time to come. The price of 40-inch sheeting 64/68, 3.15 yard has been lowered to 15.555c; while 36-inch, 48/44, 5.00 yard has been raised to 9.600c and 40/40, 6.15 yard changed to 7.804c.

Raincoat manufacturers, too, feel that no relief is in sight for them. The price of print cloth 38½-inch, 64x60 has been cut to 9.636c a yard.

The Bureau of Census stated that with the exception of tire cord, production of rayon broad-woven fabrics decreased in the third quarter 9% from production during the second quarter, and 6% below that of the third quarter of 1944. Forty-three million pounds of rayon and nylon tire and fuel cell fabrics were produced during the third quarter, 5% less than during the previous quarter, but 44% above the figure for the same period in the year 1944.

New York Quotations January 2, 1946

Drills		
38-inch 2.00-yard	yd.	$0.195
50-inch 1.52-yard		.29
52-inch 1.85-yard		.23875
52-inch 2.20-yard		.20511
59-inch 1.85-yard		.26621
Ducks		
38-inch 2.00-yard S.F.	yd.	.22875
40-inch 1.45-yard S.F.		.3086
51½-inch 1.35-yard D.F.		.33875
72-inch 1.05-yard D.F.		.45476
Mechanicals		
Hose and belting	lb.	.46
Tennis		
51½-inch 1.35-yard S.F.	yd.	.33148
51½-inch 1.60-yard D.F.		.29218
Hollands—Rubber		
20-inch	yd.	.1225/.145
30-inch		.22 /.2575
40-inch		.245 /.29
Osnaburgs		
36-inch 2.94 Cl.	yd.	.1271
40-inch 2.11 P.W.		.1623
40-inch 2.65 Cl.		.1408
40-inch 3.65 Cl.		.10946
Raincoat Fabrics		
Cotton		
Bombazine 64 x 60, 5.35	yd.	.1375
Bombazine 64 x 56, 5.50		.1350
Print cloth, 38½-inch, 64 x 60		.9636
Sheeting, 40-Inch		
48 x 44, 5.00-yard	yd.	.182
64 x 68, 3.15-yard		.15555
56 x 60, 3.60-yard		.13333
44 x 40, 4.25-yard		.10941
Sheeting, 36-Inch		
48 x 44, 5.00-yard	yd.	.96
40 x 40, 6.15-yard		.7804
Tire Fabrics—Karded Peeler		
Builder		
17¼ ounce 60" 23/11 ply	lb.	.48
Chafer		
14 ounce 60" 20/8 ply	lb.	.48
9¼ ounce 60" 10/2 ply	lb.	.45
Cord Fabrics		
25/5/3, 1 1/16" cotton	lb.	.44
15/3/3, 1 1/16" cotton	lb.	.42
12/4/2, 1 1/16" cotton	lb.	.42
23/5/3, 1¼" cotton	lb.	.44
Leno Breaker		
8¼ ounce and 10¼ ounce 60"	lb.	.45

SCRAP RUBBER

MARKET demand improved in December although there has been a downward trend in prices. After the November market dullness, the improvement in demand was encouraging, even at the lower prices, and the market generally appeared livelier. Reduction to 5½c a pound for mixed inner tubes was accompanied by similar reductions for black truck and passenger tubes to 6c and 6½c a pound, delivered. Quotations remained nominal for No. 1 peelings; while No. 2 peelings were quoted at $28 a ton, delivered. Demand for auto, bus, and truck tires was good; while demand for tire parts, however, was slower.

The latest revision of "Specifications for Scrap Rubber" by the Rubber Reclaimers Association, recently published, appears to have had a quiet reception. This specification is the first to incorporate provisions on synthetic rubber scrap, and the Association does not report any criticism to date.

With regard to these specifications, it was incorrectly stated in our Scrap Rubber market report in December that "not more than 10% synthetic rubber is permitted in any mixed scrap unless specially provided for by agreement between the buyer and seller." Actually the specifications do not permit any synthetic rubber scrap in shipments of natural rubber scrap and *vice versa;* but since some admixture is often unavoidable, an agreement for use instead of rejection by the buyer may sometimes be arranged for, but only when the prohibited material amounts to only 1% or 2%. The stringent OPA-CPA order requiring rejection of any scrap rubber shipment containing synthetic rubber was revoked late in December to the benefit of the scrap rubber industry at large.

Scrap Rubber Ceilings

	¢ per Lb.
Inner Tubes†	
Red passenger tubes	7½
Black passenger tubes	6¾
Truck tubes	6½
Tires‡	$ per Short Ton
Mixed passenger tires	20.00
Beadless passenger tires	26.00
Mixed truck tires	20.00
Solid tires	36.00
Peelings†	
No. 1 peelings (natural and synthetic)	52.25
(Recap or retread)	44.41
2 peelings (natural and synthetic)	33.00
(Recap or retread)	28.05
No. 1 light colored (zinc) carcass	57.75
Miscellaneous Items*	
Air brake hose	25.00
Miscellaneous hose	17.00
Rubber boots and shoes	33.00
Black mechanical scrap above 115 sp. gr.	20.00
General household and industrial scrap	15.00

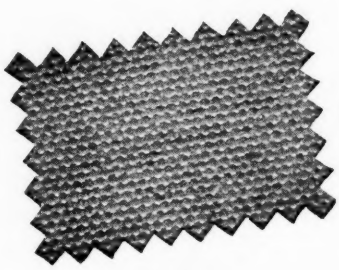
† All consuming centers except Los Angeles.
‡ Akron only.
* All consuming centers.

—so I said what have we got to lose ...let's see if Wellington Sears can give us an idea ...and that's the smartest move we've ever made

Working as they do with thousands of industrial fabrics that are used in many ways and for many purposes, our textile engineers have a knowledge of fabric applications and performances that has solved many a problem. For instance: Numbered Duck has many industrial applications—perhaps one that would benefit you.

Numbered Duck is woven from yarns of 2 or more ply in soft, medium, or hard texture. It is the heaviest cotton fabric made—being woven in a variety of weights ranging up to 49 oz. per sq. yard. This heavy Numbered Duck has a breaking strength of over 400 lbs. per sq. inch.

Numbered Duck is *free from sizing.*



OCEANIC NUMBERED DUCK is just one of the many ducks, twills, drills and sheetings we distribute for industrial purposes. Our textile engineers are always available to discuss your fabric problems.

WELLINGTON SEARS COMPANY

SELLING AGENTS

65 WORTH STREET • NEW YORK 13, N. Y.

COMPOUNDING INGREDIENTS

Current Quotations*

Abrasives

Pumicestone, powdered	lb.	$0.035	/$0.04
Rottenstone, domestic	lb.	.025	/ .03

Accelerators, Inorganic

Lime, hydrated, l.c.l., N. Y.	ton	25.00	
Litharge (commercial)	lb.	.085	/ .09
Eagle, sublimed	lb.	.085	/ .09
FBS	lb.	.085	/ .09
Magnesia, calcined, extra light technical	lb.	.25	
Heavy technical	lb.	.05	/ .1275
Extra light U. S. P.	lb.	.26	
Medium light technical	lb.	.12	
Magnesia, light technical	lb.	.25	

Accelerators, Organic

A-10	lb.	.36	/ .42
A-19	lb.	.52	/ .58
A-32	lb.	.59	/ .69
A-77	lb.	.42	/ .55
A-100	lb.	.42	/ .55
Accelerator No. 8	lb.	.63	/ .65
49	lb.	.40	/ .42
552	lb.	1.65	
808	lb.	.59	/ .61
833	lb.	1.13	/ 1.15
Acrin	lb.	.65	
Advan	lb.	.55	
Altax	lb.	.39	/ .41
Arazate	lb.	1.53	
B-J-F	lb.	.34	/ .39
Beutene	lb.	.59	/ .64
Butasan	lb.	1.10	
Butazate	lb.	1.10	
Butyl Eight	lb.	.97	/ .99
C-P-B	lb.	1.95	
Captax	lb.	.34	/ .4275
Cumate	lb.	1.60	
Cuprax	lb.	.60	/ .62
D-B-A	lb.	1.95	
Delac P	lb.	.39	/ .48
Di-Esterex-N	lb.	.50	/ .57
DOTG (Diorthotolyguanidine)	lb.	.44	/ .46
DPG (Diphenylguanidine)	lb.	.35	/ .41
El-Sixty	lb.	.36	/ .43
Ethasan	lb.	1.10	
Ethazate	lb.	1.10	
Ethylidene Aniline	lb.	.42	/ .43
Ethyl Selenac	lb.	1.60	
Tuads	lb.	1.25	
Unads	lb.	1.25	
Formaniline	lb.	.36	/ .37
Goodrite Erie	lb.	.60	/ .62
Guantal	lb.	.39	/ .48
Hepteen	lb.	.34	/ .39
Base	lb.	1.25	/ 1.40
Lead Oleate Witco	lb.	1.75	
Ledate	lb.	1.20	
MBT	lb.	.34	/ .36
MBTS	lb.	.39	/ .41
Methasan	lb.	1.20	
Methazate	lb.	1.20	
Methyl Selanac	lb.	1.60	
Tuads	lb.	1.25	
Monex	lb.	.25	
Mono Thiurad	lb.	1.25	
Morfex "33"	lb.	.60	/ .65
Novac	lb.	1.40	
O-X-A-F	lb.	.38	/ .43
Pentex	lb.	.74	/ .84
Flour	lb.	.1225	/ .1325
Phenex	lb.	.49	/ .54
Pipazate	lb.	1.53	
Pip-Pip	lb.	1.63	
Polyac	lb.	1.25	
R & H 50-D	lb.	.42	/ .43
R-2 Crystals	lb.	1.55	
Rotax	lb.	.44	/ .46
Safex	lb.	1.15	/ 1.25
Santocure	lb.	.60	/ .67
Selazate	lb.	1.60	
Setsit 5	lb.	.90	
SPDX-G	lb.	.53	/ .58
SRA No. 2	lb.	.53	/ .55
Super-Sulphur No. 2	lb.	.13	/ .15
Tetrone	lb.	1.25	
A	lb.	1.85	
Thiocarbanilide	lb.	.28	/ .33
Thiofide	lb.	.39	/ .46
Thionex	lb.	1.25	
Thiotax	lb.	.34	/ .41
Thiurad	lb.	1.25	
Thiuram E	lb.	1.25	
M	lb.	1.25	
Trimene	lb.	.54	/ .64
Base	lb.	1.03	/ 1.18
Triphenylguanidine (TPG)	lb.	.45	
Tuex	lb.	1.25	
2-MT	lb.	.58	/ .60
Ulto	lb.	.99	/ 1.04
Ureka	lb.	$0.50	/$0.57
Blend B	lb.	.50	/ .57
C	lb.	.48	/ .55
Vulcanex	lb.	.42	/ .43
Z-B-X	lb.	2.45	
Zenite	lb.	.37	/ .39
A	lb.	.42	/ .44
B	lb.	.39	/ .41
Zimate, Butyl	lb.	1.10	
Ethyl	lb.	1.10	
Methyl	lb.	1.20	

Activators

Activex	lb.	.20	/ .22
Aero Ac 50	lb.	.46	/ .52
Barak	lb.	.50	
Delac J	lb.	.50	/ .60
Dibenzo GMF	lb.	1.50	
GMF	lb.	1.95	
MODX	lb.	.295	/ .345
No. 2 RM Red Lead	lb.	.10	/ .105
Ridacto	lb.	.20	
SL-20	lb.	.1089	/ .1135

Alkalies

Caustic soda, flake, Columbia (400-lb. drums)	100 lbs.	2.50	
Liquid, 50%	100 lbs.	1.75	
Solid (100-lb. drums)	100 lbs.	2.10	

Antioxidants

AgeRite Alba	lb.	1.95	/ 2.05
Gel	lb.	.52	/ .54
H.P.	lb.	.53	/ .55
Hipar	lb.	.61	/ .63
Powder	lb.	.40	/ .42
Resin	lb.	.43	/ .45
D	lb.	.40	/ .42
Stalite	lb.	.40	/ .42
White	lb.	1.23	/ 1.33
Akroflex C	lb.	.53	/ .55
Albasan	lb.	.69	/ .74
Aminox	lb.	.40	/ .49
Antox	lb.	.54	/ .56
Betanox	lb.	.43	/ .52
B-L-E	lb.	.40	/ .49
Powder	lb.	.61	/ .70
B-X-A	lb.	.43	/ .52
Copper Inhibitor X-872-A	lb.	1.15	
Flectol H	lb.	.40	/ .47
Neozone (standard)	lb.	.61	/ .63
A	lb.	.40	/ .42
C	lb.	.43	/ .45
D	lb.	.40	/ .42
Distilled	lb.	.45	/ .47
E	lb.	.61	/ .63
Oxynone	lb.	.77	/ .90
Parazone	lb.	.68	
Perflectol	lb.	.53	/ .60
Permalux	lb.	1.18	/ 1.20
Santoflex B	lb.	.40	/ .47
BX	lb.	.54	/ .61
Santovar-O	lb.	1.15	/ 1.40
Santowhite	lb.	1.23	/ 1.38
Solux	lb.	1.28	/ 1.30
Stabilite	lb.	.48	/ .50
Alba	lb.	.69	/ .74
Thermoflex	lb.	1.18	/ 1.20
A	lb.	.61	/ .63
C	lb.	.54	/ .56
Tysonite	lb.	.165	/ .1725
V-G-B	lb.	.43	/ .52

Antiscorch Materials

Cumar RH	lb.	.105	
E-S-E-N	lb.	.34	/ .39
R-17 Resin (drums)	lb.	.1075	
RM	lb.	1.25	
Retarder W	lb.	.36	
Retardex	lb.	.445	/ .475
U-T-B	lb.	.34	/ .39
Vultrol	lb.	.50	/ .55

Antiseptics

Compound G-4	lb.	.95	/ 1.40
G-11	lb.	4.50	/ 4.75
Resorcinol	lb.	.64	

Antisun Materials

Antisol	lb.	.23	/ .28
Heliozone	lb.	.23	/ .24
S.C.R.	lb.	.32	/ .34
Sunproof	lb.	.2275	/ .2775

Blowing Agents

Unicel	lb.	.50	

Brake Lining Saturant

B.R.T. No. 3	lb.	.0175	/ .0185

Carbon Black

Conductive Channel—CC

Conductex A	lb.	.05	/ .085
Continental R20	lb.	.0455	
R40	lb.	.105	/ .14
Huber 35-C	lb.	.075	
Spheron C	lb.	.0455	
I	lb.	.0405	
N	lb.	.15	
Voltex	lb.	.105	/ .14
Hard Processing Channel—HPC			
Continental F	lb.	$0.05†	/$0.0725
Huber HX	lb.	.05†	/ .0725
Kosmobile S/Dixie-densed S.	lb.	.05†	/ .0725
Micronex Mark II	lb.	.05†	/ .0725
Spheron No. 4	lb.	.05†	/ .0725
Witco 6	lb.	.05†	/ .0725
Medium Processing Channel—MPC			
Arrow	lb.	.05†	/ .0725
Continental A'	lb.	.05†	/ .0725
Huber TX	lb.	.05†	/ .0725
Kosmobile S-66/Dixiedensed S-66	lb.	.05†	/ .0725
Spheron No. 6	lb.	.05†	/ .0725
Standard Micronex	lb.	.05†	/ .0725
Witco 1	lb.	.05†	/ .0725
Easy Processing Channel—EPC			
Continental AA	lb.	.05†	/ .0725
Kosmobile 77/Dixiedensed 77	lb.	.05†	/ .0725
Micronex W-6	lb.	.05†	/ .0725
Spheron No. 9	lb.	.05†	/ .0725
Witco 12	lb.	.05†	/ .0725
Wyex	lb.	.05†	/ .0725
Conductive Furnace—CF			
Statex A	lb.	.08	/ .10
Sterling I	lb.	.09	
Fine Furnace—FF			
Statex B	lb.	.07	/ .09
High Modulus Furnace—HMF			
Continex	lb.	.16	
Kosmos 40/Dixie 40	lb.	.05	/ .075
Modulex	lb.	.05	
Philblack A	lb.	.05	/ .06
Statex 93	lb.	.05	/ .075
Sterling L	lb.	.05	
Semi-Reenforcing Furnace—SRF			
Continex	lb.	.035	/ .055
Furnex	lb.	.035	/ .06
Gastex	lb.	.035	/ .06
Kosmos 20/Dixie 20	lb.	.035†	
Pelletex	lb.	.035	/ .06
Sterling	lb.	.035†	
Witco	lb.	.035	/ .055
Fine Thermal—FT			
P-33	lb.	.04	
Medium Thermal—MT			
Thermax	lb.	.0225	

Colors

Black			
Lampblack (commercial), l.c.l.	lb.	.12	/ .14
Blue			
Du Pont	lb.	.90	/ 3.95
Toners	lb.	.30	/ 3.50
Brown			
Mapico	lb.	.1135	
Green			
Chrome	lb.	.25	
Oxide (freight allowed)	lb.	.25	
Chromium Hydroxide	lb.	.70	
Du Pont	lb.	1.10	/ 2.85
Guignet's (bbls.)	lb.	.70	
Toners	lb.	.35	/ 4.00
Orange			
Du Pont	lb.	2.35	/ 3.05
Toners	lb.	.30	/ 1.50
Red			
Antimony Crimson, 15/17%	lb.	.48	
R.M.P. No. 3	lb.	.48	
Sulphur free	lb.	.52	
7-A	lb.	.37	
Z-2	lb.	.25	
Du Pont	lb.	.48	/ 1.65
Iron Oxide, l.c.l.	lb.	.07	/ .15
Mapico	lb.	.0885	/ .096
Rub Er-Red (bbls.)	lb.	.0975	
Toners	lb.	.25	/ 4.15
White			
Lithopone (bags)	lb.	.0425	/ .045
Albalith	lb.	.0425	/ .045
Eagle	lb.	.0725	/ .0750
Titanium Pigments			
Raycal	lb.	.055	/ .0575
Rayox LW	lb.	.145	/ .1525
R-110	lb.	.155	/ .1625
Titanox-A LO and MO	lb.	.145	/ .15
C	lb.	.055	/ .0575
Zopaque (50-lb. bags)	lb.	.145	
Zinc Oxide			
Azo ZZZ-11	lb.	.0725	/ .075
44	lb.	.0725	/ .075
55	lb.	.0725	/ .075
66	lb.	.905	/ .0975
Eagle, lead free	lb.	.0725	/ .0750
French Process, Florence			
Green Seal-8	lb.	.09	/ .0925
Red Seal-9	lb.	.085	/ .0875
White Seal-7	lb.	.095	/ .0975
Kadox, Black Label-15	lb.	.0725	/ .075
No. 25	lb.	.085	/ .0875
72	lb.	.0725	/ .075
Red Label-17	lb.	.0725	/ .075
Horse Head XX Special 3	lb.	.0725	/ .075
XX Red-4	lb.	.0725	/ .075
78	lb.	.0725	/ .075
156	lb.	.0725	/ .075
166	lb.	.0725	/ .075
St. Joe (lead free)			
Black Label	lb.	.0725	/ .075
Green Label	lb.	.0725	/ .075
Red Label	lb.	.0725	/ .075
U.S.P. No. 12	lb.	.105	/ .1075
Zinc Sulphide Pigments			
Cryptone ZS No. 800	lb.	.0825	/ .085

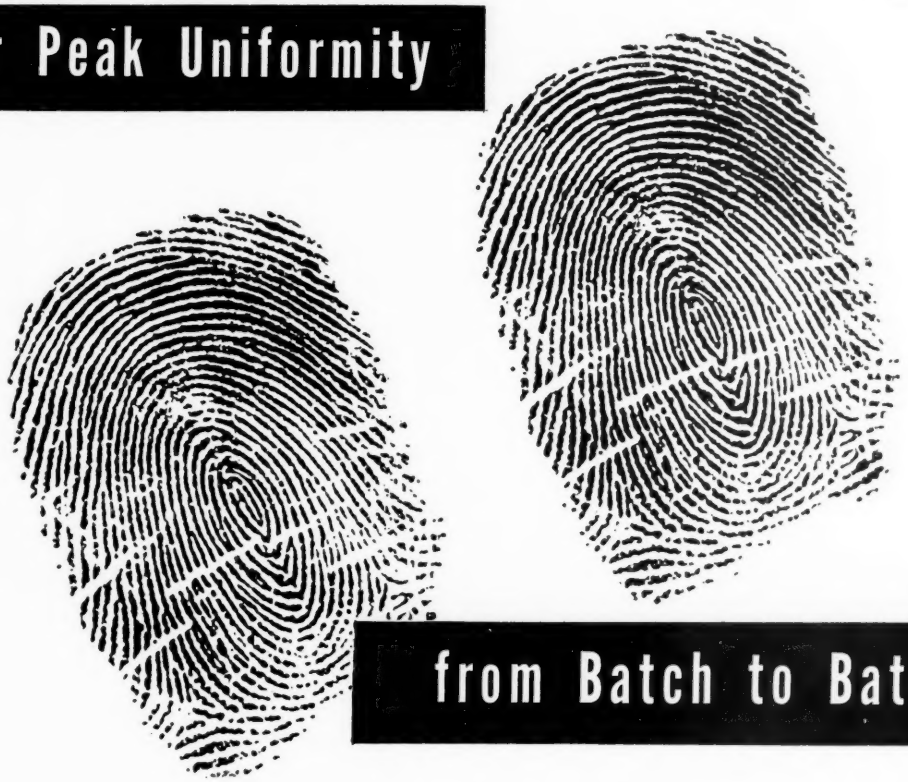
*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of all known ingredients. Prices are not guaranteed, and those readers interested should contact suppliers for spot prices.

†Price quoted is f.o.b. works (bags). All prices are carlot.

WORLD'S LARGEST PRODUCER OF SYNTHETIC RESINS

RCI

For Peak Uniformity



from Batch to Batch

RCI DIBUTYL PHTHALATE

For uniformity of end products you need uniform ingredients—and that's exactly what you get when you utilize RCI Dibutyl Phthalate for plasticizing Vinyl, Neoprene and Buna N synthetic rubbers. *Its quality is constant because RCI's system of production control tolerates nothing less.* Write to the Sales Department for further data on this thoroughly dependable controlled-quality plasticizer.

REICHHOLD CHEMICALS, INC.

General Offices and Main Plant, Detroit 20, Michigan

Other Plants:

Brooklyn, New York • Elizabeth, New Jersey • South San Francisco, California • Tuscaloosa, Alabama • Liverpool, England • Paris, France • Sydney, Australia

SYNTHETIC RESINS • CHEMICAL COLORS • PHENOLIC PLASTICS • INDUSTRIAL CHEMICALS

Yellow
Du Pont ..... lb. $1.37 /$1.75
Mapico ..... lb. .0685/ .071
Toners ..... lb. .50 / 1.37

Dispersing Agents
Bardex ..... lb. .0425/ .045
Bardol ..... lb. .02 / .0275
B ..... lb. .05 / .0525
Darvan No. 1 ..... lb. .155 / .30
2 ..... lb. .19 / .30
Nevoll (drums, c.l.) ..... lb. .02 / .025
Triton R-100 ..... lb. .12 / .25

Extenders
Advagum 1098 ..... lb. .42
1198 ..... lb. .40
Dielex ..... lb. .055 / .06
Alba ..... lb. .45
Extender 15 ..... lb. .32
Extender C ..... lb. .15
Naftolen R-100 ..... lb. .10 / .12
Oroplast H ..... lb. .1125/ .1175
L ..... lb. .0725/ .0825
M ..... lb. .0825/ .0925

Fillers, Inert
Aluminum Flake ..... ton 24.50
Asbestos Fiber ..... ton 15.50 /48.00
Barytes ..... ton 25.55 /40.00
Off color, domestic ..... ton 29.00
White, domestic ..... ton 38.50 /40.00
Blanc fixe, dry, precip ... ton 80.00
Calcene T ..... ton 37.50 /45.00
Kalite ..... ton 26.00
Kalvan ton100.00
Magnesium carbonate l.c.l. lb. .0625/ .075
Pyrax A ..... ton 10.00
W.A. ..... ton 11.50
Whiting
Suprex White (precipitated calcium carbonate) .. ton 32.50
Witco, c.l. ..... ton 16.50

Finishes
Mica, l.c.l. ..... lb. .045 / .055
Rubber lacquer, clear .... gal. 1.00 / 2.00
Colored ..... gal. 2.00 / 3.50
Shoe Varnish ..... gal. 1.45
Talc ..... ton 25.00 /35.00

Flock
Cotton flock, dark ..... lb. .095 / .112
Dyed ..... lb. .45 / .85
White ..... lb. .12 / .20
Fabrifil X-24-G ..... lb. .095
X-24-W ..... lb. .135
Filfloc 6000 ..... lb. .16
F-40-9000 ..... lb. .105
Rayon flock, colored ..... lb. 1.00 / 1.50
White ..... lb. .75 / 1.25

Latex Compounding Ingredients
Accelerator 89 ..... lb. 1.20
122 ..... lb. 1.30
Advawet ..... lb. .46
Aerosol (drums) ..... lb. .35
Antox, dispersed ..... lb. .54
Aquarex BBX Conc. ..... lb. .70
Areskap No. 50 ..... lb. .18 / .24
100, dry ..... lb. .39 / .51
Aresket No. 240 ..... lb. .16 / .22
300, dry ..... lb. .42 / .50
Aresklene No. 375 ..... lb. .35 / .50
400, dry ..... lb. .51 / .65
Black No. 25, dispersed .... lb. .22 / .40
Casein ..... lb. .24 / .2475
Collocarb (Dispersed Wyex) lb. .06 / .07
Copper Inhibitor X-872 .... lb. 2.25
Darvan No. 1 ..... lb. .30 / .34
2 ..... lb. .30 / .34
Dispersex No. 15 ..... lb. .11 / .12
20 ..... lb. .08 / .10
Factex Dispersion A ..... lb. .185
Marmix ..... gal. 1.75 / 2.00
Micronex, Colloidal ..... lb. .06 / .07
Nevilloid C-55 ..... lb. .12
pHR ..... lb. 1.25
Resin V ..... lb. .13
Santomerse D ..... lb. .41 / .65
S ..... lb. .11 / .25
Sodium Stearate ..... lb. .40
Stablex A ..... lb. .90 / 1.10
B ..... lb. .70 / .90
C ..... lb. .40 / .50
Sulphur, dispersed No. 2 .. lb. .08 / .12
Tepidone ..... lb. .63
Tysonite, dispersed ..... lb. .32 / .35
Zinc oxide, dispersed ..... lb. .12 / .15

Mineral Rubber
Black Diamond, l.c.l. ..... ton 25.00 /30.00
B.R.C. No. 20 ..... lb. .0105/ .0115
Hydrocarbon, Hard ..... ton 25.00 /27.00
Lode ..... lb. .04 / .045
MilliMar ..... lb. .055
Parmr ..... ton 21.00 /29.00
Pioneer, c.l. ..... ton 25.00 /30.00
Witco MR solid ..... ton 25.00
Granular ..... ton 30.00

Mold Lubricants
Aluminum Stearate ..... lb. .23 / .24
Aquarex D ..... lb. .60
MDL Paste ..... lb. .25
Colite ..... gal. .90 / 1.15

Dipex ..... lb. $0.1275/$0.15
Lubrex ..... lb. .25 / .30
Rubber-Glo, conc. regular gal. .94 / 1.15
Type W ..... gal. .99 / 1.20
Sericite ..... ton 65.00
Soapstone, l.c.l. ..... ton 15.00 /35.00
Zinc stearate ..... lb. .30 / .31

Reclaiming Oils
B.R.V. ..... lb. .03 / .0375
C-10 ..... gal. .19 / .24
D-4 ..... gal. .17 / .22
E-5 ..... gal. .15 / .20
No. 1621 ..... lb. .016 / .0235
S.R.O. ..... lb. .015 / .0225
X-60 (reclaiming) ..... gal. .20 / .28
X-443 ..... gal. .20 / .27

Reenforcers, Other Than Carbon Black
Buca ..... ton 40.00
Carbonex Flakes ..... lb. .03 / .035
S ..... lb. .031 / .036
Plastic ..... lb. .031 / .0335
Clays
Aerfloted Hi-White .... ton 10.00
Paragon ..... ton 10.00
Suprex ..... ton 11.00 /23.50
Catalpo, c.l. ..... ton 30.00
Champion ..... ton 11.00 /23.50
China ..... ton 25.00
Crown ..... ton 11.00 /23.00
Dixie ..... ton 11.00
Hydratex R ..... ton 20.00
"L" ..... ton 10.00
Langford ..... ton 8.50
Magnolia ..... ton 10.00
McNamee ..... ton 10.00
No. 33 ..... ton 30.00
Par ..... ton 11.00
Paraforce, c.l. ..... ton 50.00
Witco, Nos. 1 and 2, c.l. ton 25.00
Cumar EX ..... lb. .0525
MH ..... lb. .065 / .1175
V ..... lb. .0975/ .1275
465 Resin ..... lb. .035
"G" Resin ..... lb. .08
Nevindene ..... lb. .105 / .135
Resinex ..... lb. .0275/ .0325
Silene "EF" ..... lb. .055 / .06
Silical ..... ton 65.00 /85.00
Witcarb R, c.l. ton100.00

Reodorants
Coumarin ..... lb. 2.75 / 3.25
Curodex 19 ..... lb. 4.75
188 ..... lb. 5.75
198 ..... lb. 6.75
Para-Dors (ABCDE) ..... lb. .25 / 4.00
Rodo No. 0 ..... lb. 4.00 / 4.50
10 ..... lb. 5.00 / 5.50
Vanillin ..... lb. 2.25 / 2.95

Rubber Substitutes
Black ..... lb. .09 / .15
Brown ..... lb. .105 / .1875
White ..... lb. .0975/ .165
Factice
Amberex Type B ..... lb. .20
Brown ..... lb. .095 / .19
Neophax A ..... lb. .165
B ..... lb. .165
White ..... lb. .10 / .20

Softeners and Plasticizers
Abalyn ..... lb. .0722/ .0947
Ambidex ..... lb. .23
"S" ..... lb. .23
B.R.T. No. 7 ..... lb. .02 / .021
Belro Resin ..... 100 lbs. 2.71 / 3.00
Bondogen ..... lb. .55 / .60
Bunnatol G ..... lb. .40 / .50
S ..... lb. .40 / .50
Butac ..... lb. .085 / .105
Butyl Roleate ..... lb. .16 / .195
Capryl Alcohol ..... lb. .16 / .195
Circosol-2XH Elasticator for GR-S ..... gal.
Dibenzyl Sebacate ..... lb. .67 / .74
Phthalate ..... lb. .51 / .59
Dibutyl Sebacate ..... lb. .46 / .565
Dicapryl Phthalate ..... lb. .25 / .30
Dipentene ..... gal. .56 / .58
Dipolymer Oil ..... gal. .33 / .38
Dispersing Oil No. 10 ..... lb. .0375/ .04
Duraplex C-50 LV, 100% .. lb. .25 / .295
Dutrex 6 ..... lb. .025 / .0375
Hercolyn ..... lb. .1122/ .1347
JMH ..... lb. .65 / .67
Marbon S ..... lb. .65 / .75
S-1 ..... lb. .65 / .75
Myristilene ..... lb. .20 / .30
Nevinol ..... lb. .18
No. 1-D Heavy Oil ..... lb. .04
Nuba resinous pitch (drums)
Grades No. 1 and No. 2 .. lb. .029
3-X ..... lb. .0425
Palmalene ..... lb. .15
Para Flux (reg.) ..... gal. .17 / .18
No. 2016 ..... gal. .135 / .19
Para Lube ..... lb. .046 / .048
Paradene No. 1 (drums) .... lb. .0525
No. 2 ..... lb. .0525
Special (drums)
20 to 35° C. M.P. ..... lb. .0265
35 to 46° C. M.P. ..... lb. .0625
45 to 75° C. M.P. ..... lb. .0575

Paraplex AL-111 ..... lb. $0.21 /$0.25
G-25, 100% ..... lb. .75
Phthalate ..... lb. .51 / .59
Paroils ..... lb. .0975/ .18
Picco-100 ..... lb. .09
Piccocizer "30" ..... lb. .055 / .06
Piccolastic A-5 ..... lb. .24 / .245
Piccolyte Resins ..... lb. .15 / .185
Piccoumaron Resins ..... lb. .045 / .15
Piccovol ..... lb. .20 / .25
Pictar ..... gal. .18 / .23
Oil ..... gal. .45
Plasticizer B ..... lb. .35 / .45
35 ..... lb. .205 / .24
36 ..... lb. .305 / .34
Plastoflex No. 10 ..... lb. .20
No. 20 ..... lb. 25
Plastogen ..... lb. .0775/ .08
Plastone ..... lb. .27 / .30
Poly-pale Resin ..... lb. .06 / .07
R-19 Resin (drums) ..... lb. .1075
21 Resin (drums) ..... lb. .1075
Reogen ..... lb. .115 / .12
Resin R6-3 ..... lb. .38 / .40
Ridbo 369 ..... lb. .08 / .09
F ..... lb. .12
Rio Resin ..... lb. .36 / .38
RPA No. 1E ..... lb. .55
2 ..... lb. .65
3 ..... lb. .46
4 ..... lb. .80
5 ..... lb. .57
Santicizer B-16 ..... lb. .32 / .36
E-15 ..... lb. .34 / .38
M-17 ..... lb. .355 / .39
Sebacic Acid ..... lb. .48 / .55
Solvenol ..... gal. .56 / .58
Staybelite ..... lb. .06 / .065
Syntac ..... lb. .275 / .35
TR-11 ..... lb. .035
Tarzac ..... lb. .23 / .24
Tricresyl Phosphate ..... lb. .24 / .245
Turgum "S" ..... lb. .0675
Vinsol Resin ..... lb. .025 / .035
Vistac No. 1 ..... lb. .20 / .214
No. 2 ..... lb. .214 / .227
Witco No. 20, l.c.l. ..... gal. .175
X-1 resinous oil (tank car) lb. .011 / .016
XX-100 Resin ..... lb. .0525

Softeners for Hard Rubber Compounding
Resin C Pitch 45° C. M.P... lb. .01 / .016
60° C. M.P. ..... lb. .01 / .016
75° C. M.P. ..... lb. .01 / .016

Solvents
Carbon Bisulphide .... 100 lbs. 5.00 / 5.75
Tetrachloride ..... gal. .73 / .94
Cosol No. 1 ..... gal. .26 / .34
No. 2 ..... gal. .25 / .33
No. 3 ..... gal. .22 / .30
GVL ..... lb. 1.00
Industrial 90% benzol (tank car) ..... gal. .15 / .22
Nevsol ..... gal. .245 / .31
Picco ..... gal. .22 / .32
Skellysolve ..... gal. .071 / .105
Tollac ..... gal. .28 / .33

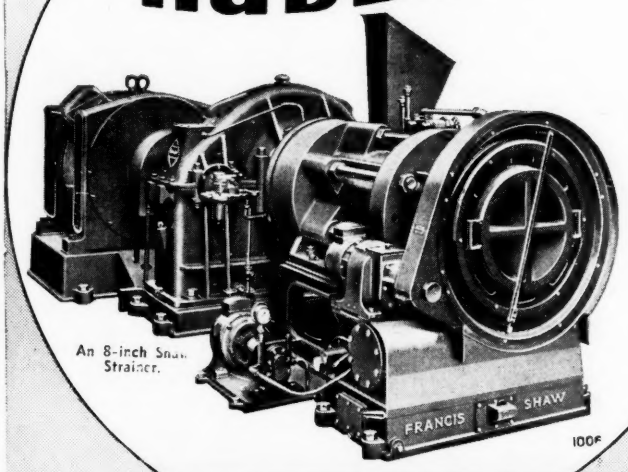
Stabilizers for Cure
Barium Stearate ..... lb. .29 / .32
Calcium Stearate ..... lb. .26 / .27
Laurex (bags) ..... lb. .1475/ .1725
Magnesium Stearate ..... lb. .31 / .32
Stearex, single pressed .... lb. .15⅜ / .16⅜
double pressed ..... lb. .15⅞ / .16⅞
Beads ..... lb. .14⅞ / .15⅞
Stearic acid, single pressed lb. .15⅜ / .16⅜
Stearite, c.l. ..... lb. .14⅞
Zinc Laurate ..... lb. .29 / .32
Stearate ..... lb. .30 / .31

Synthetic Rubber
Butaprene NF ..... lb. .45 / .60
NL ..... lb. .48 / .63
NXM ..... lb. .50 / .65
Chemigum N-1 ..... lb. .53 / .60
Hycar OR-15 ..... lb. .45 / .60
OR-25 ..... lb. .40 / .55
OS-10 ..... lb. .40 / .55
Neoprene Latex Type (dry weight)
60 ..... lb. .28 / .32
571 ..... lb. .25 / .29
Concentrated ..... lb. .28 / .32
572 ..... lb. .28 / .32
Neoprene Type CG ..... lb. .50
E ..... lb. .65
FR ..... lb. .75
KNR ..... lb. .75
M ..... lb. .65
Paraplex X-100 ..... lb. 1.00
Perbunan 18 ..... lb. .37
26 ..... lb. .38
35 ..... lb. .43
Synthetic 100 ..... lb. .41

Tackifiers
B.R.H. No. 2 ..... lb. .015
Piccolastic A-25 ..... lb. .24 / .245
Plastic ..... lb. .12
Ty-Ply Q ..... gal. 6.75 / 8.00
QA ..... gal. 6.75 / 8.00
S ..... gal. 6.75 / 8.00
SA ..... gal. 6.75 / 8.00

SHAW

RUBBER EXTRUDERS



WE HAVE BEEN MAKING ALL TYPES OF EXTRUDERS FOR THE RUBBER INDUSTRY SINCE 1879.

●

Your enquiries will receive the benefit of over 65 years' experience. We also manufacture a wide range of other processing plant for the Rubber and Plastic Industries.

FRANCIS SHAW & CO. LTD. MANCHESTER 11 ENGLAND

R-140

RMP
ANTIMONY
FOR RED RUBBER

. . . . The utmost in pleasing appearance with no deteriorating effect whatever.

●

RARE METAL PRODUCTS CO.
BELLEVILLE, N. J.

Announcing

"MARMIX"

NEW RESIN-WATER DISPERSION

FOR REINFORCING
SYNTHETIC
RUBBER LATICES

FOR SAMPLES AND LITERATURE WRITE TO

MARBON · CORP.
GARY • INDIANA

Vulcanizing Ingredients		
Magnesia, light (for neoprene) ..... lb.	$0.25	
Sulphur ..... 100 lbs.	2.05	
Insoluble, 60 ..... lb.	.16	
Rubbermaker's commercial		
100 lbs.	2.05	
Refined ..... 100 lbs.	2.40	
Telloy ..... lb.	1.75	
Tonox ..... lb.	.50	/$0.59
Vandex ..... lb.	1.75	
Vultac 1 ..... lb.	.38	/ .45
2 ..... lb.	.38	/ .45
3 ..... lb.	.42	/ .49
Waxes		
Carnauba, No. 3 chalky ... lb.	.7125	
2 N.C. ..... lb.	.7675	
3 N.C. ..... lb.	.735 /	.745
1 Yellow ..... lb.	.8325	
2 ..... lb.	.8125	
Carnube ..... lb.	.49 /	.59
Monten ..... lb.	.12 /	.17
Rubber Wax No. 118		
Colors ..... gal.	.86 /	1.41
Neutral ..... gal.	.76 /	1.31

Fixed Government Prices*

	Price per Pound	
	Civilian Use	Other Than Civilian Use
Guayule		
Guayule (carload lots)	$0.17½	$0.31
Latex		
Normal (tank car lots)	.26	.43½
Creamed (tank car lots)	.26¾	.44¼
Centrifuged (tank car lots)	.27¾	.45¼
Heat-Concentrated (carload drums)	.29½	.47
Plantation Grades		
No. 1X Ribbed Smoked Sheets .	.22½	.40
1X Thin Pale Latex Crepe .	.22½	.40
2 Thick Pale Latex Crepe ..	.22	.39½
1X Brown Crepe	.21⅜	.38⅝
2X Brown Crepe	.21⅛	.38⅝
2 Remilled Blankets (Amber)	.21¼	.38¾
3 Remilled Blankets (Amber)	.21⅛	.38⅝
Rolled Brown	.18	.35½
Synthetic Rubber		
GR-M (Neoprene GN)	.27½	.45
GR-S (Buna S)	.18½	.36
GR-I (Butyl)	.15½	.33
Wild Rubber		
Upriver Coarse (crude)	.12⅝	.26⅛
(washed and dried)	.20¼	.37¾
Islands Fine (crude)	.14⅝	.28¼
(washed and dried)	.22½	.40
Caucho Ball (crude)	.11⅝	.24¾
(washed and dried)	.19½	.37
Mangabiera (crude)	.08½	.19¾
(washed and dried)	.18	.35½

* For a complete list of all grades of all rubbers see Rubber Reserve Co. Circular 17, p. 169, May, 1943, issue.

RECLAIMED RUBBER

NO CHANGE occurred in the market the past month, with a strong demand continuing greater than supply for all items. The industry is still operating below full capacity owing to the unavailability of labor for overtime work. There have been no changes in the industry upon issuance of the recent revision of "Specifications for Scrap Rubber," by the Rubber Reclaimers Association, as practices were already generally in accordance with the provisions of the specification. There has been a great influx of foreign demand which has been largely by-passed because of inability of supply to meet domestic requirements.

Reclaimed Rubber Prices

	Sp. Grav.	c per Lb.
Auto Tire		
Black Select	1.16-1.18	7 / 7¼
Acid	1.18-1.22	8 / 8¼
Shoe		
Standard	1.56-1.60	7½ / 7¾
Tubes		
Black	1.19-1.28	11¾ / 12
Gray	1.15-1.26	12½ / 13½
Red	1.15-1.32	12½ / 13
Miscellaneous		
Mechanical blends ..	1.25-1.50	5 / 6

The above list includes those items or classes only that determines the price bases of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

Electrostatic Hazards

(Continued from page 528)

essing floor area in order to insure that grounding resistance does not exceed recognized safety limits. There is an erroneous belief in the industry that an accumulation of static electricity cannot occur in those processing operations where calender trains, band building and tire building machines, metal table tops, idler rolls, and other such metallic parts are grounded. It is true that all machine parts and metallic systems throughout stock processing should be thoroughly and meticulously grounded, but such grounding does not affect either the generation or the accumulation of static electricity on the stock. Meticulous grounding practices are of utmost importance in preserving safe procedures for dispensing flammable liquids where hazardous conditions exist throughout the flow of solvents from the incoming tank car to the individual mixing machines and at processing units.

(6) Calculating electric time constant where employes with acquired body electrification constitute hazards. This is important especially to insure adequate grounding of employes entering zones containing flammable fuel-air mixtures.

(7) Investigating and determining the electrostatic capacitance of mitigating means used to reduce electrification, and the non-sparking properties of antistatic devices to determine criteria of safety.

(8) Investigating possibilities for induced electrification.

(9) Measuring ambient and stock temperatures.

(10) Measuring relative humidity and conditions of ventilation.

(11) Checking history of prior stock treatment and storage conditions.

(12) Determining any further pertinent technical information peculiar to the particular problem.

It is believed that all electrostatic fire and explosion hazards throughout the rubber industry can be mitigated and controlled to the extent of their virtual elimination. A scientific program for adequately controlling electrostatic hazards will speed up processes, increase production, reduce spoilage, eliminate needless humidification, reduce costs, and raise the morale of operators. An electrostatic survey requires a thorough quantitative study of each hazardous operation throughout the plant and interpretation of test data by means of an exact knowledge of the laws of electrostatics as they apply in the rubber industry. The costs of such a survey are considered small in comparison with the direct and indirect savings which can be realized through adoption of an adequate control program.

Rims Approved and Branded by The Tire & Rim Association, Inc.

Rim Size	Nov., 1945
15" & 16" D. C. Passenger	
16x4.00E	308,443
16x4.25E	30,336
16x4.50E	247,717
16x5.00E	32,810
16x5.00E	5,506
16x5.00F	3,575
16x5.00F	27,714
15x5.50F	16,968
16x5.50F	9,807
16x6.00F	1,696
16x4.00E-Hump	34,555
15x4.50E-Hump	19,822
16x4.50E-Hump	11,048
15x5.00F-Hump	7,367
16x5-K	40,445
16x6-L	27,372
17" & Over Passenger	
18x2.15B	2,644
Flat Base Truck	
20x3.75P	9,270
14x4.33R	21,633
18x4.33R	515
20x4.33R	54,124
20x5.00S	218,042
24x5.00S	2,015
20x6.00T	14,724
20x7.33V	80,115
22x7.33V	29,887
24x7.33V	5,707
24x8.37V	1,414
Semi D. C. Truck	
16x4.50E	2,533
15x5.50F	15,870
16x5.50F	20,629
Tractor & Implement	
12x2.00C	20,290
12x3.00D	5,544
15x3.00D	7,551
16x3.00D	7,313
19x3.00D	13,895
21x3.00D	1,528
18x3.25E	1,192
21x3.25E	315
20x4.50E	5,468
22x4.50E	1,919
18x5.50F	5,433
20x5.50F	7,516
24x5.50R	5,040
36x5.50R	155
24x6.00S	1,604
36x6.00S	52
20x8.00T	350
24x8.00T	2,196
28x8.00T	1,494
32x8.00T	4,147
36x8.00T	1,198
W8-24	724
W8-32	5,036
W8-36	709
W9-24	3,197
W9-28	14,399
W9-36	6,526
W9-38	4,646
W10-24	926
W10-28	6,219
W10-36	897
W10-38	4,696
DW9-38	4,062
DW10-38	5,791
DW11-28	2,365
DW11-30	527
DW11-36	4,242
DW11-38	2,662
DW12-26	1,169
DW12-30	7
DW12-34	1,526
Earth Mover	
20x11.25	32
24x11.25	76
24x13.00	64
32x13.00	6
24x15.00	188
28x15.00	50
28x17.00	24
TOTAL	1,469,269

COLITE CONCENTRATE

A HIGH QUALITY CONCENTRATED LIQUID MOULD AND MANDREL LUBRICANT—*NON-TOXIC, NON-TACKY, ODORLESS.*

- *Simplifies the removal of cured rubber from the moulds.*
- *Results in a transparent satin-like finish.*
- *Does not build up on the moulds.*
- *Extremely concentrated and low in cost.*

A Direct Source for Zinc and other Metallic Stearates.

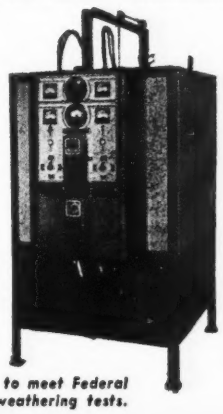
THE BEACON COMPANY
PURITY · UNIFORMITY · DEPENDABILITY
Chemical Manufacturers
97 BICKFORD STREET · BOSTON, MASSACHUSETTS

In Canada: PRESCOTT & CO., REG'D., 774 ST. PAUL ST., W. MONTREAL

WEATHERING TEST for rubber products

Weathering effects of sunlight, rain, heavy dew and thermal shock reproduced in the laboratory at an accelerated rate that reduces years of actual weathering to a few days of testing in the —

ATLAS TWIN-ARC WEATHER-OMETER



The Twin-Arc Weather-Ometer has full automatic control of light and water periods. The Atlas Cycle Timer unit can be set to reproduce any combination of weathering conditions. A direct reading thermal regulator, automatic shut-off switch and a running time meter is included on the control panel. After setting exposure cycle on the control panel the Weather-Ometer is safe to be left in continuous operation over night without attention except to replace carbons once in 24 hours.

The Atlas Weather-Ometer is required to meet Federal Specifications demanding accelerated weathering tests.

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Originators and sole manufacturers for over a quarter of a century. . . Weather-Ometers, Launder-Ometers, Fade-Ometers are the accepted standard accelerated testing machines all over the world.

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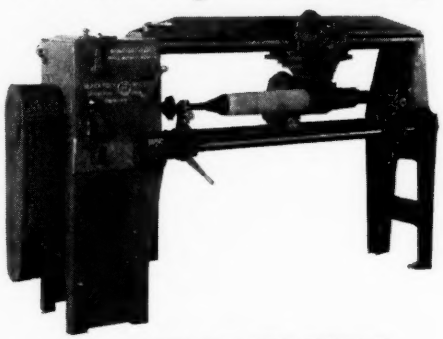

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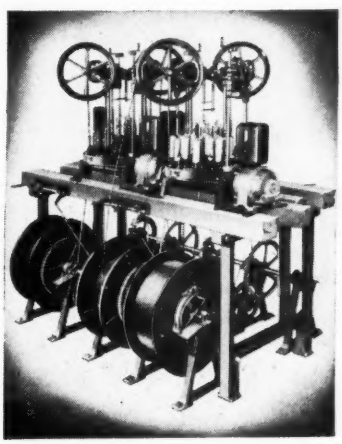

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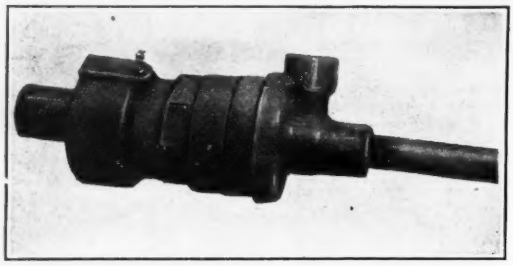

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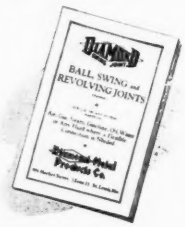

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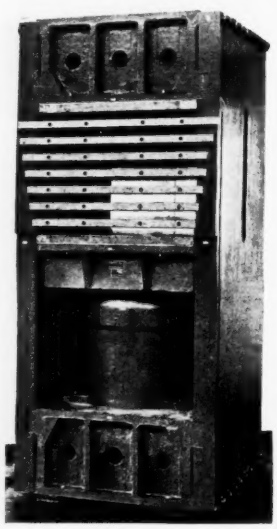

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32" Diameter, 16" Stroke, Eight 2" Openings., 42" x 54" Pressing Surface. Working Pressure 2,000 Pounds.

Write for Bulletin "Modern Hydraulic Presses," Hydraulic Press Division

The FRENCH OIL MILL MACHINERY CO.
PIQUA OHIO

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	October, 1945		October, 1944	
UNMANUFACTURED	Quantity	Value	Quantity	Value
Crude rubber, etc.....lbs.	1,240,811	$ 474,057	442,352	$ 176,782
Latex (dry weight) .....lbs.	106,759	34,815	15,102	4,124
Gutta percha .....lbs.	.....	.....	223	79
Rubber, recovered .....lbs.	2,332,200	169,949	1,862,200	132,597
Rubber, powdered, and waste .....lbs.	641,900	14,268	216,100	7,331
Balata .....lbs.	.....	.....	4,343	2,464
Rubber substitute .....lbs.	417,200	108,211	245,800	70,570
TOTALS	4,738,870	$ 801,300	2,786,120	$ 393,947
PARTLY MANUFACTURED				
Hard rubber in rods or tubes .....lbs.	605	$ 499	411	$ 325
Rubber thread, not covered lbs.	1,330	1,199	339	352
TOTALS	1,935	$ 1,698	750	$ 677
MANUFACTURED				
Belting	.....	$ 33,662	.....	$ 32,809
Gaskets and washers	.....	10,388	.....	11,475
Hose	.....	21,827	.....	44,552
Mats and matting	.....	2,199	.....	6,815
Packing	.....	14,745	.....	8,025
Canvas shoes with rubber soles .....prs.	161	535	.....	.....
Boots and shoes of rubber prs.	11,446	8,170	18	90
Clothing of waterproofed cotton or rubber	.....	818	.....	510
Cement	.....	15,802	.....	22,620
Liquid sealing compound	.....	6,676	.....	5,471
Heels .....prs.	2,550	255	1,000	89
Druggists' sundries	.....	32,963	.....	28,423
Gloves .....doz. prs.	583	2,502	358	2,961
Hot water bottles	.....	975	.....	2,305
Nursing nipples .....gross	521	2,081	.....	.....
Golf balls .....doz.	1	10	.....	.....
Raincoats .....no.	2	32	3,468	28,107
Tires, bicycle .....no.	479	748	518	504
Pneumatic, for vehicles ..no.	223	12,783	67	2,220
Solid, for automobiles and motor trucks .....no.	24	1,166	7	87
Other	.....	525	.....	791
Inner tubes .....no.	584	1,458	80	987
Bicycle .....no.	315	233	500	210
Tire repair material	.....	10,601	.....	.....
Other rubber manufactures....	.....	137,805	.....	168,852
TOTALS	.....	$ 318,959	.....	$ 367,903
TOTALS, Rubber Imports	.....	$1,121,957	.....	$ 762,527

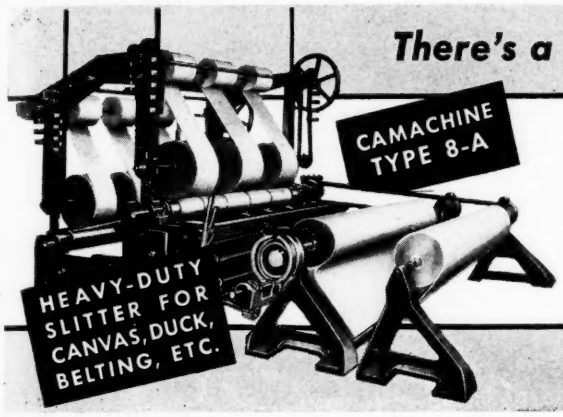
Exports of Crude and Manufactured Rubber

UNMANUFACTURED				
Crude rubber, including synthetic rubber .....lbs.	605,716	$ 224,596	2,026,791	$ 810,629
Waste rubber .....lbs.	2,396,500	36,856	3,403,800	39,185
TOTALS	3,002,216	$ 261,452	5,430,591	$ 849,814
PARTLY MANUFACTURED				
Soling slabs .....lbs.	2,925	$ 606	38,425	$ 6,978
MANUFACTURED				
Belting .....lbs.	268,571	$ 158,728	98,055	$ 40,999
Hose	.....	52,472	.....	27,575
Canvas shoes with rubber soles .....prs.	108,970	109,033	2,240	2,430
Boots and shoes of rubber prs.	235,977	377,855	134,959	327,087
Heels .....prs.	222,890	16,596	179,147	17,946
Soles .....prs.	4,948	990	55,225	13,210
Clothing of rubber and waterproofed clothing	.....	14,362	.....	36,910
Tires, pneumatic for motor vehicles .....no.	16,230	417,299	17,609	424,486
For other vehicles .....no.	492	1,997	851	42,986
Inner tubes .....no.	13,424	64,218	11,258	39,013
Insulated wire and cable	.....	105,247	.....	218,306
Other rubber manufactures ..	.....	56,875	.....	58,612
TOTALS	.....	$1,375,672	.....	$1,249,560
TOTALS, Rubber Exports	.....	$1,637,730	.....	$2,106,352

CEYLON

In his report for the year ended December 31, 1944, P. Saravanamuttu, the Rubber Controller for Ceylon, states that exports of dry rubber in that year totaled 102,858 tons. The total acreage under rubber for the period was 653,917 acres; this does not include areas newly planted in 1944. In that and the preceding year, permits under the Rubber (New Planting) Regulation (1942) were issued for 47,539 acres.

Although the International Rubber Regulation Agreement was terminated in April, 1944, and the committee was dissolved, the existing arrangements for collecting and communicating information were retained, in view of the intention of the Secretary of State to negotiate for the formation of a new committee.



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For Use with Neoprene

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Makers of Stamford "Factice" Vulcanized Oil

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64 YEARS WITHOUT REORGANIZATION

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for every purpose
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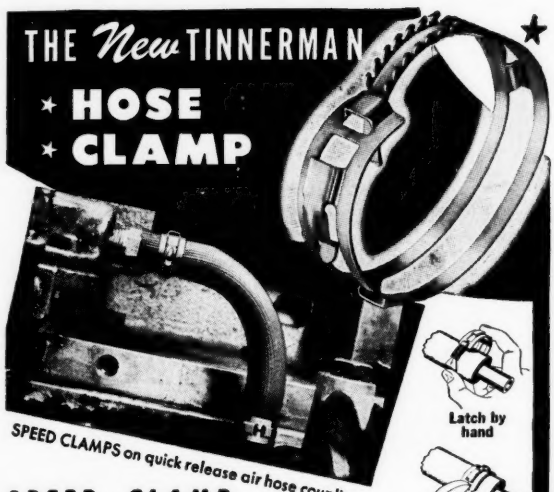

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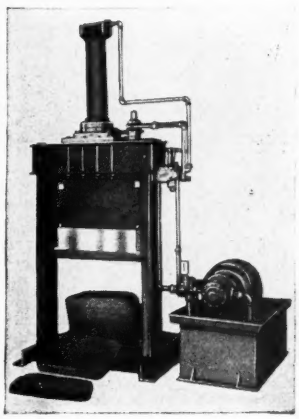

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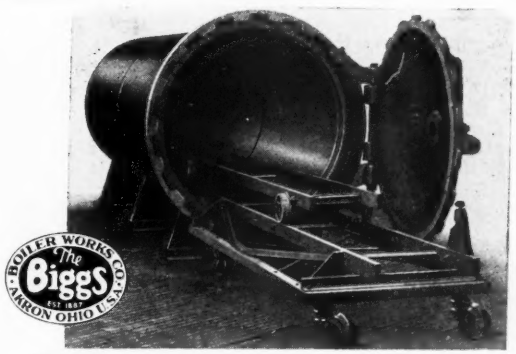

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CHEMIST . . . PREFERABLY WITH EXPERIENCE IN RUBBER AND synthetic coated fabrics to work in laboratory of medium-size coating plant in Philadelphia area. Advise fully regarding education, background, and salary expected. Address Box No. 415, care of INDIA RUBBER WORLD.

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ENGINEER—RUBBER MFG. PLANT. Must be fully experienced installation, maintenance, and operation of Mills, Banbury Mixer, Tubers, Presses, etc. Also supervise machine shop for making molds and plant maintenance. In reply state age, experience, and salary requirements. Plant located Eastern Pennsylvania. Address Box No. 442, care of INDIA RUBBER WORLD.

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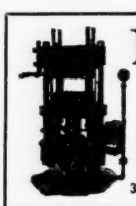

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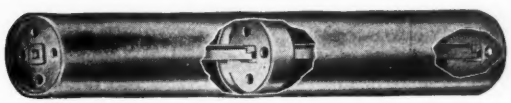

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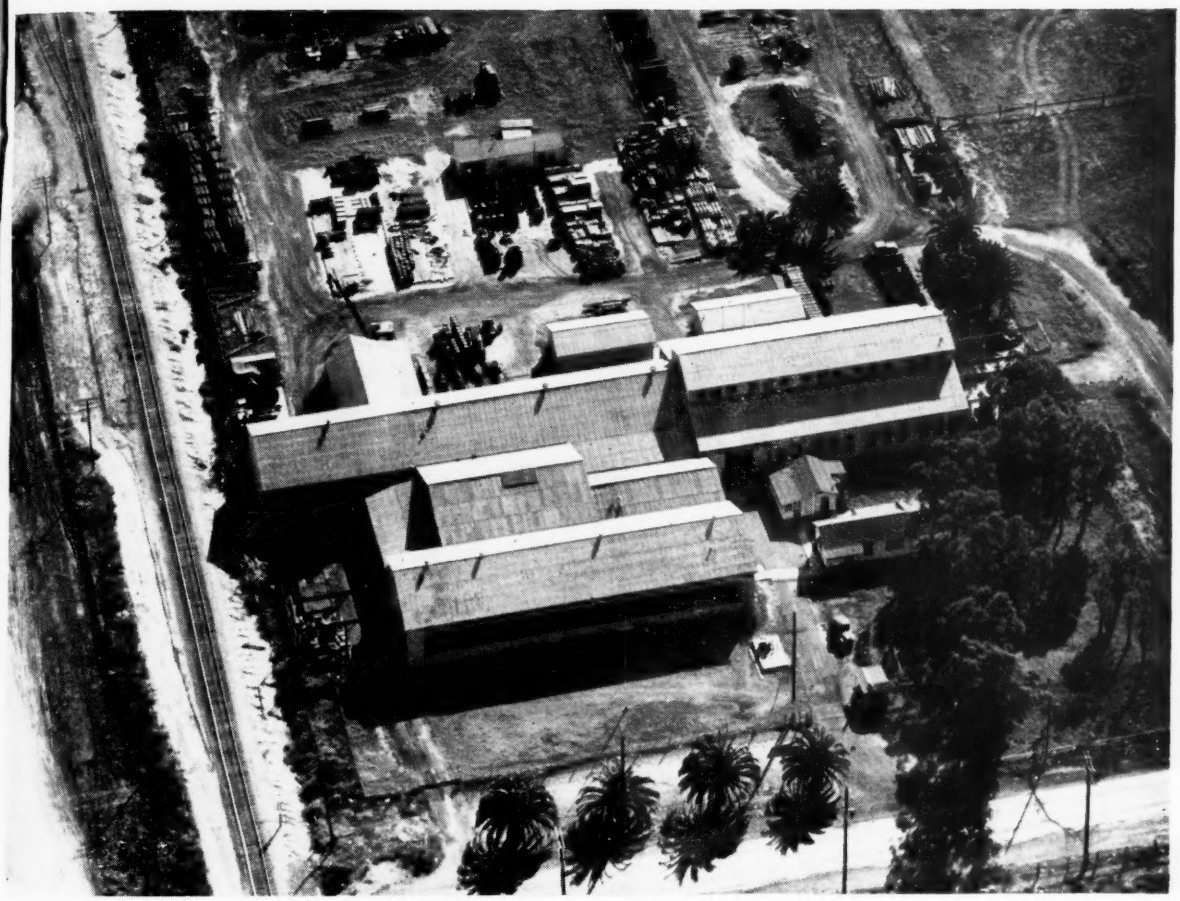

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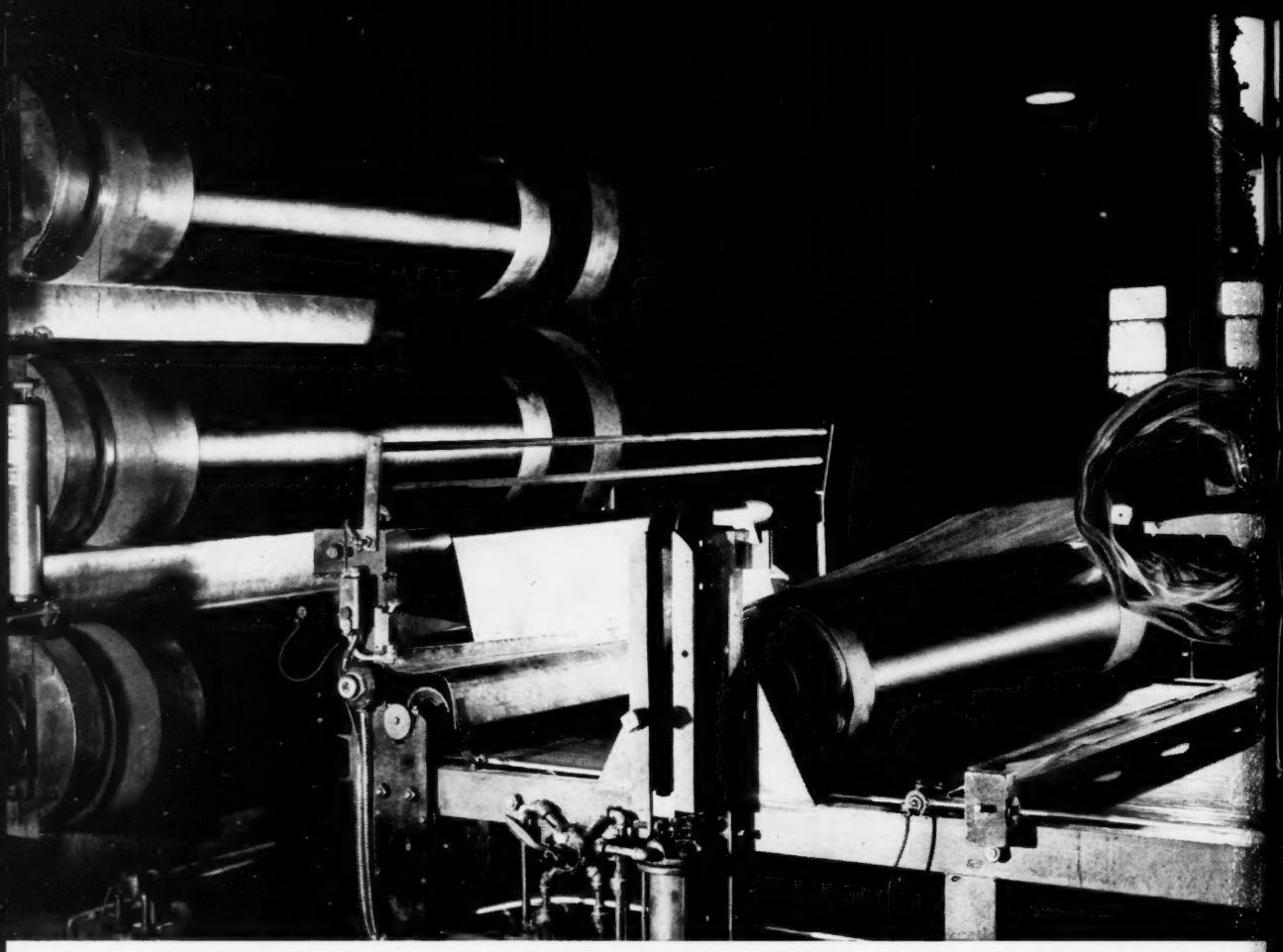

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